



# NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

## THESIS

**PERSUASION DETECTION IN CONVERSATION**

by

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March 2010

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**PERSUASION DETECTION IN CONVERSATION**

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Submitted in partial fulfillment of the  
requirements for the degree of

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## **ABSTRACT**

In this thesis, we present a system for annotating persuasion in conversation based on a social-psychological model. We augmented the social model developed by James Cialdini with some of our own categories for annotators to label. The conversations consisted of 37 hostage negotiation transcripts from private and public sources, with all personal information removed from the private source transcripts. We evaluated the level of agreement between annotators using Cohen’s Kappa measurement.

Our initial results showed only fair to moderate agreement, with an average kappa score around 0.41 for transcripts of significant length (over 200 utterances). Based on these results, annotators revised the annotation model and eliminated some categories of persuasion while adding “other” as a catchall for any persuasive utterance not covered by Cialdini. The revised model showed a significant increase in agreement with an average kappa score of 0.78 for transcripts of significant length (over 200 utterances). Based on this revised model, annotators adjudicated a final persuasion corpus for the 37 transcripts that will be used in future works on persuasion detection.

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## EXECUTIVE SUMMARY

In this thesis, we present a system for annotating persuasion in conversation based on a social-psychological model. The conversations consisted of 37 hostage negotiation transcripts from private and public sources, with all personal information removed from the private source transcripts. Our researcher used the principles outlined in James Cialdini's work on persuasion. Cialdini's principles of persuasion are reciprocity, commitment and consistency, liking, scarcity, authority and social proof. To these six categories we also added "reason." Using this model and a codebook outlining persuasive examples in hostage negotiations, we assigned different transcripts to each annotator (with some overlap to test for agreement) and had the annotators label each utterance as persuasive or non-persuasive based on the model. We evaluated the level of agreement between annotators using Cohen's Kappa score and the overlapping transcripts.

Our initial results showed only fair to moderate agreement, with an average kappa score around 0.41 for transcripts of significant length (over 200 utterances). Based on these results, annotators revised the annotation model and eliminated the category of "reason" while adding the category of "other" as a catchall for any persuasive utterance not covered by Cialdini. In addition, the codebook was updated to include more examples and more specific guidelines for recognizing persuasive utterances. The revised model showed a significant increase in agreement with an average kappa score of 0.78 for transcripts of significant length (over 200 utterances). Based on this revised model, annotators adjudicated a final persuasion corpus for the 37 transcripts that will be used in future works on persuasion detection.

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## **I. INTRODUCTION**

### **A. COMPUTER SCIENCE AND PERSUASION: THE GOAL**

The goal of this research was to develop an annotated corpus of persuasive conversations and is the first step in developing machine learning systems that can automatically detect persuasion in conversations. This corpus was developed from 37 hostage negotiations because they have numerous examples of persuasion. Both the negotiator and the hostage taker have goals they wish to fulfill, and these conversations provide annotators with many instances of persuasion attempts for training and experimentation. The goal of the annotators was to agree consistently on the persuasion attempts, from either party, in a transcript, and to use these annotated transcripts as a corpus for future work.

### **B. MOTIVATION**

The motivation for this research came from several sources. One source was that this field of research in computer science was largely unexplored. There has been research in related areas like perspective analysis, but persuasion analysis remains untouched. Another source of motivation was the power that persuasion has over individuals. An example of this power can be seen in suicide bombers. While there are many factors that go into a suicide bomb operation, convincing a person to strap explosives to their body and blow themselves up at a target requires some form of persuasion. Based on this research, it may be possible to construct a machine learning system that can automatically detect persuasion in conversations, like those on foreign-fighter recruitment Web sites, and alert authorities or analysts to the situation.

### **C. DEFINING PERSUASION AND THE ANNOTATIVE MODEL**

There are many questions to be answered when dealing with persuasion in conversation. What is persuasion? Is the detection of persuasion in conversation innate

to people or are there specific types of markers for persuasion attempts? If persuasion detection has specific markers, can these markers be learned and identified by annotators? Our research attempted to answer all of these questions by annotating a corpus of 37 hostage negotiations with persuasion tags based on the social-psychological model of James Cialdini.

In general terms, persuasion is the ability of one party to convince another party to act or believe in some desired way. When defining a persuasion attempt in a conversation corpus, it is simply the agreement between two or more annotators that an utterance is persuasive based on a social model. In other words, if annotators can agree that some utterance of a conversation is meant to be persuasive, then it is. The key for annotators is to use a social model that allows them to have consistent agreement. For our research, we used the model defined by James Cialdini with six categories of persuasion: reciprocity, commitment and consistency, liking, scarcity, authority and social proof. In addition, we added “reason,” and later “other,” as persuasion categories. Annotators were asked to tag utterances in transcripts as persuasive or non-persuasive based on these categories.

## **D. RESULTS**

The results from the initial experiment showed fair agreement but it was not very convincing. Based on these lackluster results, the social model was revised, eliminating some categories and adding others, and the experiment was rerun. Based on the revised model, the annotators showed substantial agreement with significant improvement from the original model. Using the revised model, a final adjudicated corpus of hostage negotiations was created between the annotators.

## **E. ORGANIZATION OF THESIS**

This thesis is organized into several chapters: background information, the codebook and experiment design, results and analysis, and the appendix. The background information outlines related work in computer science (specifically perspective analysis), the social model of persuasion developed by Cialdini, and the

agreement measurement calculations. The codebook and experiment design sections details specific examples of each type of persuasion category and describes the annotation scheme. It also describes the revised model with a more specific codebook used by the annotators when the experiment was rerun. The result and analysis section details the agreement between the annotators and also notes any other significant findings. The Appendix is an example of a fully tagged transcript for reference to the reader.

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## **II. BACKGROUND**

### **A. INTRODUCTION**

There has not been a great deal of computer-science research in persuasion detection. As far as we know, this research is the first of its kind to develop an annotation scheme that would allow for computational modeling of persuasion. As such, we are basing our annotation scheme on the most prevalent social-psychological theory of persuasion. This work was done by James Cialdini and is the foundation of most work in persuasion. Our research essentially codifies Cialdini’s work and adds our new category, reason. This chapter will briefly explore related work, specifically perspective analysis, and then explain the social-psychological model that will be used in the annotation scheme. An evaluation method will also be explained to assess how much agreement exists between annotators.

### **B. PERSPECTIVE VERSUS PERSUASION**

The closest research in computer-science to persuasion detection is the work on perspective detection, meaning the ability to detect the point of view from which a document is written. Though our research does not use perspective, the methods are important such as those developed by Lin, Wiebe and Hauptmann (Lin, Wilson, Wiebe, & Hauptmann, 2006). The researchers used the bitter-lemons corpus ([bitterlemons.org](http://bitterlemons.org)) to test perspective classification using different types of machine-learning classifiers such as Naïve Bayes and Support Vector Machines. The bitter-lemons corpus is a collection of documents that have the same subjects but are written from different perspectives (Israeli and Palestinian). By using an automatic subjective sentence classifier (Riloff & Wiebe, 2003) they split each document into subjective and non-subjective sentences. Using computational models, they were able to correctly identify the documents perspective, either Israeli or Palestinian, with a high degree of accuracy (over 97% for the editors of bitter-lemons and over 86% for guest writers). While they had a high degree of accuracy at the document level, they also tried applying their models to the sentence level

by attempting to classify a sentence with an Israeli or Palestinian perspective. A sentence's perspective was labeled according to the document from which it was selected. Their accuracy classification at the sentence level was just over 75%, implying that perspective classification at the sentence level is much more difficult than at the document level.

## **C. PERSUASION PRINCIPLES**

### **1. Background**

The persuasion model for this research was based on the principles researched and developed by James Cialdini and used eight principles to mark persuasion in conversations.

The study of persuasion involves the psychology of compliance, meaning the ability to get one party to agree to a set of conditions or desires of another party. According to Cialdini, the principles of persuasion transcend language, ethnicity, and cultures. These principles may be prioritized differently from culture to culture, but their existence and influence is important. This “transcendence” exists because persuasion principles are fixed action patterns. Thus the assumption of this body of research is that these principles are not learned, meaning they are innate and instinctual, but their ordering can be learned. Cialdini calls these patterns “click, whirr” behaviors. “Click and the appropriate tape is activated; whirr and out rolls a standard sequence of behaviors” (Cialdini, *Influence: Science and Practice*, 2001). The key to detecting persuasion is determining what exactly triggers the “click, whirr” response.

Fixed action patterns are not limited to persuasion. They are actually more readily recognizable in nature. Courtship and mating rituals in the animal and insect kingdoms are examples of actions that precipitate pre-conditioned responses, as if the responses were stored on tapes in the subconscious. Cialdini documented eight principles of persuasion in his research that trigger compliant responses, and these principles will be used in annotating the police and hostage negotiation transcripts.

In police and hostage negotiations, there are usually many persuasion attempts between the two parties (law enforcement and lawbreakers). This thesis will not only attempt to identify the persuasion attempts on the law enforcement side, but also the attempts from the lawbreakers. If demands are unreasonable, the police or Federal Bureau of Investigation (FBI) do not usually accommodate, but they may if the demands are small, such as food or a pack of cigarettes. Police often use small desires to make agreements (release hostages by a certain time, trade hostages for food, etc.) with the lawbreakers. There are occasions when the lawbreakers can persuade the law enforcement officers to acquiesce to small demands without giving any real concessions. Since this thesis is focused on any kind of persuasion attempt, an attempt from either party will be noted.

## **2. Principles of Persuasion**

Cialdini identified six main principles of persuasion through social experiments and statistical analysis: reciprocity, commitment and consistency, social proof, liking, authority, and scarcity. In addition to these six elements, this research uses an additional one: reason. Cialdini mentioned reason, but it did not have its own category in his work. It will, however, be included as a category in our work, due to the nature of police and hostage negotiations where negotiators tend to give many reasons or justifications for their requests.

### ***a. Reason***

Reason in persuasion attempts is an explanation or justification for some kind of request. This justification is very common, and not just in police and hostage negotiations. For example, a mother might say to a child, “Do not touch the stove when it’s hot, because you will get burned.” This type of statement may lie in an action-consequence realm, but reasons alone can be influential, even if the reasons are meaningless.

An experiment conducted in 1978 by social psychologist Ellen Langer showed the power of reason in invoking a compliant response (Langer, Blank, &



Chanowitz, 1978). The experiment utilized 120 subjects and Langer's students tried to cut in front of the subjects at a photocopier with a minimum wait time of five minutes between requests. There were three separate cases for the subjects and Langer's students. In one case (no information), the student simply asked to cut in line with the phrase, "Excuse me, I have five pages. May I use the Xerox machine?" This case had only a 60 percent compliant response from those waiting in line. In the second case (sufficient information), the student asked, "Excuse me, I have five pages. May I use the Xerox machine because I am in a rush?" This instance had a 94 percent compliant rate. This increase may be somewhat intuitive and not very insightful. The people in line were given a reason ("I'm in a rush") and they politely accommodated the request. The key result of this experiment lies in the third case (placebic information), where the student asked, "Excuse me, I have five pages. May I use the Xerox machine, because I have to make copies?" This case offers no new information from the first case (with 60 percent compliance), but the results were astonishing. Nearly 93 percent complied with the request.

Table 1 shows the summation of their results (Langer, Blank, & Chanowitz, 1978). It is worth noting that if the favor was considered a large one, the results decreased. A favor was considered small if the number of pages the student wanted to copy was fewer than the subject's number of pages to be copied and large otherwise.

Table 1. Results from Langer's Experiment

	Reason		
Favor	No information	Sufficient Information	Placebic Information
Small	60%	94%	93%
Large	24%	24%	24%

The effect of giving a reason, even a meaningless one, is significant because it demonstrates the ability for reason to affect compliance outcomes. Cialdini notes that the word "because" triggered a "click/whirr" response. In hostage

negotiations, negotiators often give a reason for requesting a particular action, so this experiment will include reason as a category of persuasion, because purely lexical information can have a dramatic impact.

Below is an example of using reason in a persuasion attempt. This excerpt is part of a transcript between a 911 dispatcher and a suicidal man (Grant) who had called the police and was threatening to kill himself. The transcript was provided by the American Civil Liberties Union ([aclusandiego.org](http://aclusandiego.org), 2008).

911 DISPATCHER: Okay. Grant?

GRANT: Yes.

911 DISPATCHER: I'm here, talk to me. You just keep spilling your feelings to me, just to talk to me, just tell me what you need.

GRANT: I don't know what I need.

911 DISPATCHER: If you have to cry, you cry. Okay? If it makes you feel better, I want you to cry, because sometimes crying helps, you know, makes you think better. Nobody is going to come in, okay, but I want you to talk to me so we can help you. This has been—this has to end. Because I don't want you to hurt yourself. But I need you to put down that gun. If you put it down, nobody is going to come in. We're going to talk to you, okay? Can you put it down for me, away from you, because I don't want anything to happen to you.

The 911 dispatcher is trying to persuade Grant to put the gun down and uses simple reasons for the justification (“Because I don’t want you to hurt yourself” and “Because I don’t want anything to happen to you”). The dispatcher did not offer any kind of concession or promise, but simply made a request and provided a reason.

In the above example, the dispatcher is using reason to persuade an action by Grant. Reason can also be used to deter an action, just like a mother telling her child not to touch a hot stove. Here is another example, from a transcript provided by Paul Taylor (personal communication, September 20, 2009). In this example, the hostage taker is contemplating killing his accomplice before killing himself.

Hostage Taker: YEAH, WELL IF I DO ANYTHING TO <NAME> IT'S  
BECAUSE SHE WANTS IT

Negotiator: WELL, THAT'S DUMB. THAT'S REALLY DUMB

Hostage Taker: DO IT TO MYSELF

Negotiator: YOU KNOW, YOU KNOW, YOU CAN END UP IN HELL  
FOR DOING SOMETHING LIKE THAT

Hostage Taker: I'M GONNA END UP THERE ANYHOW

Negotiator: NO, YOU NEVER KNOW

In this example, the negotiator is not offering anything, but is merely giving a reason not to perform an action. Reason can play a powerful role in promoting and deterring actions in hostage negotiations.

#### ***b. Reciprocity***

The principle of reciprocity is a human obligation to repay favors, gifts, invitations and assistance. Cialdini gives an example that shows how powerful the principle reciprocity can be. In 1985, Ethiopia was one of the most destitute countries on the planet, ravaged by drought, starvation and economic ruin. Yet in 1985, the government of Ethiopia sent \$5,000 to the government of Mexico for earthquake assistance. The reason for this assistance was because Mexico had sent aid to Ethiopia during the Italian invasion of 1935. In Cialdini's words, Ethiopia's obligation to reciprocate for the 1935 aid "transcended great cultural differences, long distances, acute famine, many years, and immediate self interest." (Cialdini, *Influence: Science and Practice*, 2001)

Reciprocity is seemingly very powerful. People can feel obligated to return a favor, even if no real favor has been done. One common example is organizations that send people free mailing labels along with a donation card. These people did not ask for mailing labels (i.e., no favor was done), but many feel obligated to reciprocate the gesture by giving some amount of money. In some cases, the favors and obligation do not have to be directly connected.

Another example Cialdini gives is a “rejection then retreat” approach. Cialdini and his students masqueraded as representatives of a youth organization and asked random people if they would chaperone a group of juvenile delinquents to the local zoo. Initially, 83 percent of people asked to chaperone refused. Cialdini and his students then took a different approach. They asked a group of different random people for a larger favor first. The first request asked people to be counselors at the youth organization for a period of two years. As expected, the vast majority refused. After the initial request and rejection, Cialdini and his students asked for the people to be chaperones to the zoo. This time, they had a 50 percent acceptance rate (compared with 17 percent earlier), nearly a 300 percent increase (Cialdini, Vincent, Lewis, Catalan, Wheeler, & Darby, 1975). By starting with a large favor, then requesting something smaller, Cialdini and his students had made a concession that the people in the experiment felt obligated to reciprocate.

The “rejection then retreat” approach is common in police and hostage negotiations. The following is an excerpt from the ACLU transcript (aclusandiego.org, 2008) between the suicidal man (Grant) and the San Diego police. The suicidal person, Grant, is in his apartment with a gun threatening to commit suicide.

POLICE NEGOTIATOR: Okay. So what do you say? I think, you want to come outside.

GRANT: No, no.

POLICE NEGOTIATOR: Okay. You think you’re going to want to come outside later?

GRANT: I don’t know.

POLICE NEGOTIATOR: Okay. Can I get you at least to put the gun down?

GRANT: No.

POLICE NEGOTIATOR: How about if I get you to take the magazine or the clip out of the gun?

Note how the police negotiator makes the initial request for Grant to come outside. When Grant refuses, the police negotiator retreats from the original request and asks for something smaller by comparison (“come outside later”). After each rejection, the requests continue to decrease in scope.

*c. Commitment and Consistency*

Cialdini notes that “a high degree of consistency is normally associated with personal and intellectual strength. It is the heart of logic, rationality, stability, and honesty” (Cialdini, *Influence: Science & Practice*, 2001). It is because consistency is so powerful to the human condition that commitment becomes the key to the entire principle. If someone commits to an agreement, that person has a subconscious and overpowering urge to be consistent with respect to that agreement. Commitments are more powerful when they are public and not viewed as forced upon the party.

Commitment and consistency play key roles in different military conflicts. The commitment and consistency principle was used by the Chinese with captured American Prisoners of War (POWs) during the Korean War. The Chinese would often get American POWs to admit mildly anti-American sentiments, such as “America is not perfect.” Once the POWs submitted, the Chinese would press them towards more substantial statements, including essay writing including a signature. Once an American POW had written the essay and signed his name, he often felt compelled to remain consistent with these viewpoints and change his own image to reflect what he had put on paper (Schein, 1956).

Far from the Korean War, both in distance and in time, the American war in Iraq from 2003 to the present day has drawn many Islamic fighters from different nations. Some of these fighters volunteer for martyrdom operations and sign contracts. The following picture an example of a martyrdom contract provided by the Combating Terrorism Center at West Point ([www.ctc.usma.edu](http://www.ctc.usma.edu)).

بسم الله الرحمن الرحيم

**تعهد الأخ الاستشهادي**

١. يُوقع من قبل الإخوة بسوريا وكذلك هنا بعد الدخول.  
٢. تعبئة استبانة المهاجر.  
٣. أخذ صورة شخصية وتسحية من جواز السفر.  
٤. دخول دورة أمنية أو قراءة المذكرة المعدة لذلك.  
٥. التوقيع على التعهد المرفق.

**عهد وميثاق**

أتعهد أنا: خلف أحمد نوفل الرشيد الكنية: أبو أحمد الالتزام بالتالي:

(١) أن دخولي للعراق وطلي تنفيذ عملية استشهادية كان نابع عن رغبتي الشخصية البحتة، ولا توجد لدي أي نية مُبَيَّنة للتغيير إلى مقاتل بعد الدخول، وأقسم بالله على ذلك.

(٢) السمع والطاعة في المشط والمكره لأمراتي المسئولين عني.

(٣) في حالة تراجعي عن التنفيذ لا يلتزم التنظيم بحوي بأي شيء سوى إخراجي من العراق بالطريقة التي يراها مناسبة.

(٤) عدم الإدلاء بأي معلومات صحيحة لأي جهة ونحت أي طرف كان.

(٥) أقسم بالله العظيم أن ألتزم بما اتفق عليه في هذا العهد وعدم مخالفته تحت أي ظرف كان وعليه أوقع.

الاسم: خلف أحمد نوفل الرشيد  
الرقم: \_\_\_\_\_  
الكنية: أبو أحمد  
التوقيع: \_\_\_\_\_  
البصمة: \_\_\_\_\_

Figure 1. Suicide Bomber Contract  
(From the Combating Terrorism Center at West Point, n.d.)

The translation of the document is as follows:

In the Name of God the Most Compassionate and Merciful

Pledge of the Martyr Brother

1–To be signed by the brethren in Syria and here after their entrance.

2–Filling the immigrant's form.

3–Acquiring a personal picture and a copy of the passport.

4–Attending a training session or reading the prepared notebook on the matter.

## 5–Signing the attached pledge

### Pledge and an Agreement

I Khalaf Ahmad Nawfal al-Rashdan, alias Abu Ahmad [TC: handwritten]  
pledge my commitment to the following:

- 1–That my request to enter Iraq to conduct a martyrdom operation emanates from my own desire; and I have no hidden desire in becoming a fighter, after my entrance, and I pledge my oath on the matter.
- 2–To obey, through invigorating and adverse times, my leaders and those who are in charge of me.
- 3–In case I do retreat from executing [TC: the mission], the organization is not committed to me with anything except taking me out of Iraq in the way it sees fit.
- 4–I will not reveal any information to any party, under any circumstances.
- 5–I pledge my oath in the name of God the Almighty to abide by what has been agreed upon in this contract, and not to back out under any circumstance and here to, I sign.

Name: Khalaf Ahmad Nawfal al-Rashdan [TC: handwritten]

Number: \_\_\_\_\_

Alias: Abu Ahmad [TC: handwritten]

Signature: [TC: handwritten]

Finger Print: [TC: a print]

Martyrdom operations are not new to military conflicts, but note the signature and the thumbprint on the document. They represent a commitment by the individual, just like essays written during the Korean War by American POWs. The signature and thumbprint represent a commitment to the martyrdom operation, that is, the commitment not to be a fighter but a suicide operative and “not to back out under any circumstance.” During the course of this research, no statistics were found that describe the completion-withdrawal rate of suicide operatives that commit with a thumbprint and signature, but it is worth noting that their recruiters are using the principle of commitment and consistency when convincing people to perform extreme actions.

In police and hostage negotiations, commitment and consistency often arise when a deal or agreement is being struck between two parties. In the Waco standoff between the Branch Davidians and the FBI (Waco Siege), there are many cases where the FBI agreed to perform certain tasks in exchange for the release of women and children. Here is an excerpt from one of the transcripts (Texas State University), where “DAVID” is David Koresh of the Branch Davidians and “HENRY” is an FBI negotiator:

DAVID: I'm glad you have a concern for the children like I do because I have --

HENRY: Yes. Okay. What we will do is I will start working on this, okay. And it's either going to be a video and the audio, or at least we're going to get radio. But I'll get you something. Or I'll go to work on getting you something. Okay?

DAVID: Yeah. Let's, let's -- like I say you'll, then you'll know, understand where I'm coming from.

HENRY: Okay. But I want you to understand, okay, I'm going to hold you this. You're telling me that --

DAVID: I --

HENRY: -- that you're going to send everybody out. I'm going to want everybody out.

DAVID: Okay.

HENRY: Okay.

DAVID: Do what you can though.

HENRY: Okay. But send me a couple of kids. I'm going to send a car to pick up the two kids.

In the above excerpt, Henry tried to get a commitment from David for the release of people from the compound in exchange for the FBI coordinating the release of a message from David onto the radio. By getting David to commit, Henry hoped that the desire to remain consistent would play a role in the release of the children.



*d. Social Proof*

Social proof is another principle of persuasion based on people “viewing a behavior is correct in a given situation to the degree that [they] see others performing it” (Cialdini, *Influence: Science and Practice*, 2001). Some examples are rather common, such as advertisers using the popularity of a product to sell it to new people. A recent commercial by the Ford Motor Company (2010) touts the F-150 truck as the best-selling truck in American for 33 years. This screenshot is from the commercial posted on YouTube (YouTube - F-150 “33 years and counting”). The goal of this advertisement is to let consumers know that most Americans truck buyers buy the Ford F-150, so “you” (the potential consumer) should, too.



Figure 2. F-150 Commercial (From the Ford Motor Company, 2010)

Social proof can have some extreme effects. The Heaven’s Gate (Heaven’s Gate (religious group)) mass suicides grimly illustrate the power of social pressure to follow the crowd’s actions. A person’s actions can be heavily influenced by the perception of what is acceptable behavior. Cialdini gives another example of panic at a bank in Singapore. After the panic, it was determined that a large crowd waiting at a

bus stop (near the front entrance of the bank) was perceived by bank customers to be a line of people waiting to withdraw their money. Bank customers panicked and got in line to withdraw their money, mimicking the perceived actions of the crowd. This action, in turn, led to an even larger crowd. Humans are able to trust the collective knowledge of a crowd, especially if uncertainty plays a factor (Cialdini, *Influence: Science and Practice*, 2001).

In police and hostage negotiations, social proof is not always apparent, mainly because the situations deal with small numbers of people. There is usually only one negotiator and one hostage taker. However, because the situation is usually a first experience for the hostage taker, the negotiator can use that element of uncertainty along with social pressure from the hostage taker's friends and family. The following is an example of social proof, where PN60 is the police negotiator and HT01 is the hostage taker. The full transcript was provided by Randy Rogan (personal communication, October 2, 2009).

PN60: Well things could get a lot worse.

HT01: Naw, I done been through the worse part.

PN60: Oh you have aw I can't hardly believe that. I mean you know -- [?]

HT01: Yeah.

PN60: -- you're not dying from a disease or something like that, are you?

HT01: No, I'm not.

PN60: Suppose you got a healthy body and a healthy mind, right?

HT01: [Laughs] I wouldn't bet on that. [Laughs]

PN60: Well hell that's quite a bit just that one right there. What? Well I don't know what to tell you you know, you got all -- [?]

HT01: Huh?

PN60: -- Your friends talkin to ya and tryin to give you advice and these people who know you and like you.

PN60 uses the uncertainty of the situation and the pressure from the hostage taker's friends to convince HT01 to give up. Social proof is one of the more difficult things to notice in police and hostage negotiations, due to the subtlety in which it is used.

*e. Liking*

Liking is another principle of persuasion that focuses on similarity, compliments, and association. Humans will act favorably towards persons with whom they share similar characteristics, or at least if they perceive that they share characteristics. These characteristics can be opinions, politics, personalities, religious upbringings, or social backgrounds.

Cialdini cites several research projects in this phenomenon. One study showed that antiwar demonstrators were more likely to sign a petition without reading it, as long as the petitioner was dressed in similar fashion (Suedfield, Bocher, & Matas, 1971). Another project found that survey petitions mailed to persons with similar names as the surveyor nearly doubled the compliance response (Garner, 1999). People are more readily compliant with people that share some kind of connection.

In addition to similarity, positive compliments are another influential method for applying the liking principle of persuasion, even if the compliments are not accurate or true. A study was conducted with a group of subjects who were given different kinds of compliments and then asked for a favor. The compliments were positive, negative and mixed for different subjects. The results of the study were that the researcher with only positive compliments was liked best, even when the subjects knew full well that the compliment was intentional flattery meant to gain favor (Drachman, deCarufel, & Inkso, 1978).

In police and hostage negotiation, the negotiator often tries to establish a bond with the hostage taker. This bond can be based on similar backgrounds or experiences. Here is an excerpt from another transcript (P. Taylor, personal communication, September 20, 2009).

Hostage Taker: SHE DIDNT WANT IT SHE DIDNT WANT IT AND I  
WASNT DOING IT FOR ME I WAS DOING IT FOR  
HER

Negotiator: YEAH WELL YOU KNOW <NAME> THEY GET TO  
THAT AGE YOU KNOW THEY KNOW EVERYTHING

Hostage Taker: YEAH YEAH

Negotiator: THEY KNOW EVERYTHING YOU CANT TELL THEM  
ANYTHING

Hostage Taker: I KNOW IT I KNOW IT I KNOW IT WELL

Negotiator: YOU KNOW I WENT THROUGH THAT WITH MY BOYS  
YOU KNOW BUT NOW THEYRE ALL GROWN

Hostage Taker: THE SAME THING WITH MINE

Negotiator: MY YOUNGEST ONE IS TWENTY SIX

In the above extract, the negotiator used the principle of liking, invoking a similar life experience raising children. This tactic is designed to let the hostage taker know that the negotiator is familiar his struggles and was an attempt to create a bond between the two men. This bond may have made the hostage taker more receptive to the negotiator's attempts to resolve the hostage standoff. For hostage negotiations, the principle of liking may be important in building rapport and trust and can help the negotiator reach a peaceful solution.

#### *e. Authority*

The authority principle states that people will respond to requests if they feel there is an authority figure authorizing or condoning the action. A famous study performed by Yale university psychologist Stanley Milgram showed just how far average people will respond to authority, even if the authority figure is asking for something that is completely unreasonable (Milgram, 1974). The study had the subjects assist with a researcher by putting electric shock nodes on a patient who was playing along with the experiment. The subjects were told that the experiment was designed to test the effects of punishment on learning ability, and they were told to administer shocks to the patient when prompted by the researcher (the authority figure) based on incorrect answers to

questions. The electric shocks were not real, but the patient cried out in pain and begged for mercy and pleaded to be released. The purpose of the research was to determine how much pain normal people would inflict on a patient because someone in authority told them to do it. Cialdini writes:

The answer is most unsettling...the [subject] was willing to deliver as much pain as was available to give. Rather than yield to the pleas of the victim, about two-thirds of the subjects in Milgram's experiment pulled every one of the 30 shock switches in front of them and continued to engage the last switch (450 volts) until the researcher ended the experiment. More alarming still, almost none of the 40 subjects quit his job...when the victim first began to demand his release, nor later when he began to beg for it, nor even later when his reaction had become, in Milgram's words 'definitely an agonized scream.' (Cialdini, *Influence: Science and Practice*, 2001)

The explanation for these results lies in human beings' sense of obligation to persons of authority. Even subjects who wished to stop the experiment continued to participate and obeyed the researcher until it was over.

In police and hostage negotiations, the negotiators do not often invoke their authority in the law or give orders to a hostage taker. Orders might be normal for a typical police arrest where a police officer will give commands like "put your hands up" or "get down on the ground." In the negotiations transcripts studied in this thesis, negotiators rarely gave orders, because the concept of authority is not clear to the hostage taker. The hostage takers were inclined to think of themselves as the persons with authority and would issue demands themselves. Here is another excerpt from the San Diego police standoff ([aclusandiego.org](http://aclusandiego.org), 2008).

POLICE NEGOTIATOR: You shut up and listen to me Grant. Just shut up and listen to me Grant. Grant, shut up and listen to me Grant, Grant, Grant, Grant, people will not be allowed into your house. Okay are you going to be a coward?

GRANT: Because of (?)

POLICE NEGOTIATOR: Grant shut up and listen to me. Grant shut up and listen to me. Will you do that, keep your

mouth shut. You need to come out of the house  
so other people can go home.

GRANT: You can send them home, I am not coming out.

This police standoff did not end well as Grant ultimately committed suicide, and the ACLU has called for better training of the San Diego police officers for handling situations like this one (ACLU Calls for Training of Police Negotiators After Suicide, 2008). This example is not meant to deride the police negotiator's actions, but to illustrate how the concept of authority can be used in negotiations, both successfully and unsuccessfully.

Instead of giving orders to a hostage taker, negotiators often will take an indirect approach to the authority principle. One such approach is to use family members of the hostage taker to persuade compliance with the police. The authority figures do not have to be a direct part of the situation; they can simply be referenced. Here is another section of the San Diego police transcript (aclusandiego.org, 2008).

POLICE NEGOTIATOR: So killing yourself is going to do some good?

GRANT: Well, obviously, I don't have to think about anything else.

POLICE NEGOTIATOR: You don't, but that's the easy way out. What  
about your mother and father, your brother,  
your friends. Don't let them down. What's that?

GRANT: What about them?

POLICE NEGOTIATOR: Well, how upset are they going to be?

GRANT: I don't want to upset my friends.

POLICE NEGOTIATOR: And you're going to let all those people down  
like that?

The negotiator was appealing to Grant's sense of duty and obligation to his parents so he would not "let them down." The authority principle, while indirect, can be exercised by negotiators to convince hostage takers to comply with requests.

*f. Scarcity*

The principle of scarcity states that people are more likely to be influenced if they feel circumstances are fleeting or resources are limited. There is a direct correlation between the scarcity of an item and its perceived value. When an item becomes scarce, it becomes less accessible to people, meaning people lose the freedom to acquire it. People respond to this loss by wanting those freedoms even more (Cialdini, *Influence: Science and Practice*, 2001).

Most people see this principle everyday in some form of advertising. Things like “limited time offer,” “sale ends Friday,” and “call now while supplies last” are all examples of attempted persuasion with scarcity. Basic free markets operate on supply and demand, with supply representing the scarcity of a commodity. Commodities markets can have huge influences on peoples’ behaviors. When Hurricane Katrina landed on the gulf coast in August of 2005, it caused significant damage to the American gasoline infrastructure. Figure 3 shows that gasoline prices jumped almost 18 percent in one week (U.S. Retail Historical Gasoline Prices).

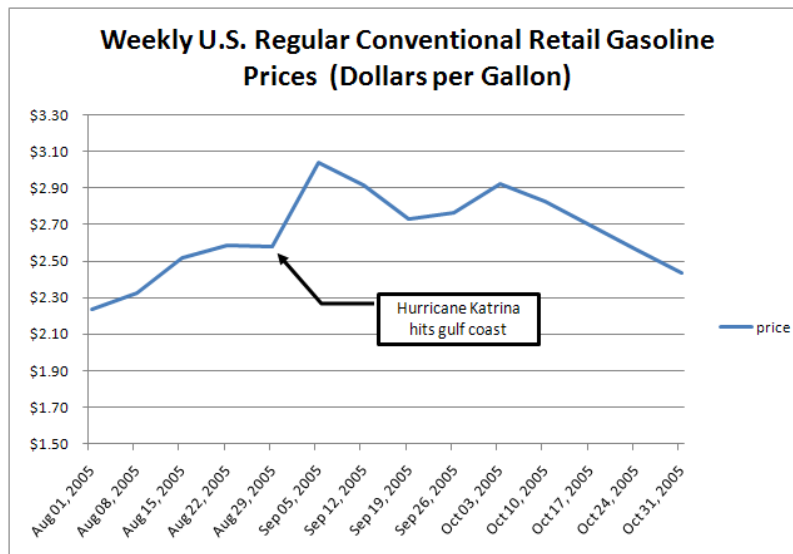


Figure 3. U.S. Gasoline Prices from August 2005–October 2005

Some gas stations ran out of fuel to sell to customers. The shortage of gasoline was attributed to both a reduction in supply as well as a customer swarm on the

remaining amounts at gas stations (Goo & Blum, 2005), fearing that there would be no gasoline available in the area. People consciously and unconsciously react to scarcity and “compliance practitioners’ reliance on scarcity is frequent, wide-ranging, systematic and diverse” (Cialdini, *Influence: Science and Practice*, 2001).

In the police and hostage negotiations, scarcity is a method of persuasion used by both law enforcement and the hostage takers. Many demands from hostage takers come with deadlines and the promise of horrific consequences if their demands are not met. Here is an example from another transcript (R. Rogan, personal communication, October 2, 2009). Note the personal information such as personal names have been removed for distribution reasons.

PN60: . . . to <HT01 First Name>. (pause)

HT01: Yes, sir.

PN60: Get the cigarettes all right?

HT01: Yes, sir.

PN60: Everybody's feeling all right out there?

HT01: . . . to be.

PN60: Your lawyer's enroute. Should be here in about 15 minutes.

HT01: I'm setting a 5:00 deadline.

PN60: Uh, <HT01 First Name>, we can't, uh, be sure that we're gonna have all of the answers by 5:00. Uh, let's not set a deadline on it. L-let's, uh, play it by ear and see how things go. We've play, tried to play it pretty straight with you, haven't . . . and, and it's not going to resolve the matter. We've got to find out primarily before we can get answers what your intentions are as far as what if <Prisoner Last Name> fails, goes with you, what if he refuses to go with you.

HT01: . . . not the point either. The point is I've set some demands, and if they're not met, then the people are going to die.

This example is very common in hostage negotiations. The hostage taker sets a deadline that will expire and expects the negotiator to acquiesce to the demands. While demands are not always met, many negotiators are persuaded into some form of action to keep the hostage taker from hurting anyone.



The principle of scarcity is more subtlety applied by the negotiator. The negotiator is wise not to set deadlines with the hostage taker, because the situation can deteriorate rapidly. Often the approach is more subtle, focusing on circumstances instead of time. One tactic used is letting the hostage taker know that the situation is not as bad as it seems, but it could get worse. Here is another example (P. Taylor, personal communication, September 20, 2009):

Hostage Taker: YOU SAYING IF I'M CHARGED FEDERALLY?

Negotiator: OK, YOU ARE CHARGED FEDERALLY IF THAT'S WHAT YOU WANT. I MEAN YOU KNOW YOU'RE THE ONE THAT'S CALLING THE SHOT, BUT YOU HURT SOMEBODY OVER THERE, WELL, YOU'RE PROBABLY GONNA GO TO <PLACE>. THAT'S FOR <EXPLETIVE> SURE

Hostage Taker: I AINT GONNA HURT NOBODY

Negotiator: BECAUSE IF YOU GIVE UP RIGHT NOW, YOU'LL PROBABLY GET CHARGED FEDERALLY. THAT'LL BE THE DEAL. BUT IF YOU DRAG THIS THING ON AND ON AND ON AND HURT THAT WOMAN OR HURT ANYBODY ELSE...

In this example, the hostage taker would rather be charged federally than by the state. The negotiator realizes this desire and says that outcome is a possibility, but it is a fleeting opportunity.

***g. Simultaneous Forms of Persuasion***

Seven principles of persuasion have been discussed: reason, reciprocity, commitment and consistency, social proof, liking, authority, and scarcity. The transcript excerpts provided were selected because they were clear-cut examples of each form. These categories of persuasion are not mutually exclusive. It is possible for a persuasion attempt to fall into multiple categories. This example comes from another transcript. (R. Rogan, personal communication, October 2, 2009)

Hostage Taker: How much time you talking about?

Negotiator: We don't know, but, uh, let's get the food order squared away.  
How 'bout if you let the stewardess off, uh, to get the food,  
and, uh, she, and then we'll let somebody bring the food up to  
the plane?

The underlined section could be attributed to commitment and consistency or reciprocity. One view is that the negotiator is trying to get the hostage taker to commit to an exchange of food for stewardesses. Another view is that the negotiator is providing food and wants the hostage taker to reciprocate by releasing the stewardesses. Either one or perhaps both are correct. This thesis tags the individual persuasion principles of utterances in conversation, but these principles will be combined in each utterance to determine if it is meant to be persuasive. In the above example, if one annotator marks the utterance as “commitment/consistency” and another annotator marks it is as “reciprocity,” the differences will be noted, but there will be agreement that the statement is meant to be persuasive. Moreover, annotators are allowed to mark utterances with multiple persuasion tags if they think it falls into multiple categories.

#### **D. ANNOTATION EVALUATION METHODS**

In evaluating annotated transcripts, the Cohen Kappa (Cohen, 1960) score is a useful tool that can take into account the agreement on both persuasive and non-persuasive utterances while discounting the probability of random agreement. The kappa score is defined as

$$\mathbb{k} = \frac{ObservedAgreement - ChanceAgreement}{NonChanceAgreement} = \frac{Pr(a) - Pr(e)}{1 - Pr(e)}$$

where  $Pr(a)$  is the relative observed agreement and  $Pr(e)$  is the hypothetical probability of random agreement. Table 2 shows the hypothetical results of an annotated transcript.

Table 2. Agreement Matrix for Two Annotators

		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	$P_AP_B$	$P_AN_B$
	Non-Persuasive	$N_AP_B$	$N_AN_B$

$P_AP_B$  = the total number of utterances that both annotator A and B marked persuasive.  $N_AP_B$ =the total number of utterances that annotator A marked non-persuasive but annotator B marked persuasive.

$P_AN_B$  = the total number of utterances that annotator A marked persuasive but annotator B marked non-persuasive.

$N_AN_B$  = the total number of utterances that both annotator A and B marked non-persuasive.

Assuming the annotators tagged the data independently, the probability of agreement,  $\Pr(a)$  is defined as the percentage of the total utterances where both annotators agree:

$$\Pr(a) = \frac{P_AP_B + N_AN_B}{n}$$

where  $n$  is the total number of utterances in the transcript. To calculate chance agreement, each annotator must be scored on the number of utterances they marked persuasive and non-persuasive with respect to the transcript:

$$\Pr(P_A) = \frac{P_AP_B + P_AN_B}{n}$$

$$\Pr(P_B) = \frac{P_AP_B + N_AP_B}{n}$$

$$\Pr(N_A) = \frac{N_AP_B + N_AN_B}{n}$$

$$\Pr(N_B) = \frac{P_AN_B + N_AN_B}{n}$$

Thus, the chance of random agreement (assuming independence) is defined as:

$$\Pr(e) = [\Pr(P_A) \times \Pr(P_B)] + [\Pr(N_A) \times \Pr(N_B)]$$

With  $\Pr(a)$  and  $\Pr(e)$  defined, Cohen's Kappa score can now be calculated with the formula previously mentioned:

$$\frac{\text{ObservedAgreement} - \text{ChanceAgreement}}{\text{NonChanceAgreement}} = \frac{\text{Pr}(a) - \text{Pr}(e)}{1 - \text{Pr}(e)}$$

Figure 4 shows an interpretation of the kappa score (Landis & Koch, 1977).

<u>Kappa Statistic</u>	<u>Strength of Agreement</u>
<0.00	Poor
0.00–0.20	Slight
0.21–0.40	Fair
0.41–0.60	Moderate
0.61–0.80	Substantial
0.81–1.00	Almost Perfect

Figure 4. Interpretation of Cohen's Kappa Measurement (From Landis & Koch, 1997, p. 165)

This research will use the kappa score and the measurements in the previous figure to evaluate the annotation scheme.

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### **III. CODEBOOK AND EXPERIMENT DESIGN**

#### **A. INTRODUCTION**

In this chapter, we present our annotation scheme for persuasion and the coding guidelines developed. The annotation scheme uses the seven categories discussed in Chapter II: reason, reciprocity, commitment and consistency, authority, liking, scarcity and social proof. In addition, commitment and consistency were split into separate categories for a total of eight possible tag markers for each utterance. We use the eight categories to tag the data using different annotators, and then compare the results using Cohen's Kappa score.

#### **B. INITIAL MODEL AND FIRST ANNOTATION OF DATA**

A group of three annotators attempted to tag 37 transcripts with the eight categories of persuasion discussed in Chapter II (reason, reciprocity, commitment, consistency, liking, scarcity, authority, and social proof). Annotator A tagged 16 transcripts, Annotator B tagged 17 transcripts and Annotator C tagged 16 transcripts. There was an overlap of 12 transcripts in total with each pair of annotators sharing four transcripts. These 12 overlapping transcripts were used in the analysis portion of this thesis.

The annotators tagged each utterance in their transcript. An "utterance" is simply defined as a stretch of speech containing at least one word. For this work, we treat each "turn" in the transcription as an utterance. The following example from the Waco transcripts (Texas State University, 1993) contains six utterances:

Utterance 1: JIM: Is that okay?

Utterance 2: DAVID: That's fine.

Utterance 3: JIM: Okay. Now tell everybody we'll get, we got -- what we're going to work on the next few minutes is moving the armored ambulance and the buses. Okay?

Utterance 4: DAVID: Okay. You're going --

Utterance 5: JIM: So when they --

Utterance 6: DAVID: -- to bring those up then now, right?

There are three utterances from “Jim” and three from “David.” Utterances do not have to be complete sentences, and words like “uh-huh” and “okay” are counted as utterances like in the following example (Texas State University, 1993) from the Waco transcripts:

Utterance 1: JIM: You know. Just so we have no mistakes. If you see the armored ambulance pull up, you can call me.

Utterance 2: DAVID: Okie doke.

Utterance 3: JIM: Hey, your message got out great.

In this example there are three utterances with two by “Jim” and one by “David.” David’s answer to Jim is simply “okie doke,” but it counts as an utterance.

## **1. Initial Codebook**

### ***a. Reason***

Reason was tagged when someone in the conversation gave a justification for some action or request. The following examples show the same request but only one has a reason:

Utterance 1: I want you to put the gun down

Utterance 2: I want you to put the gun down because I don’t want to see you get hurt.

Only Utterance 2 would be tagged with reason by the annotators, even though both utterances are requesting the same thing. Annotators were told to tag an utterance with reason only when a request was made and there was a justification given.

***b. Reciprocity***

The reciprocity principle has many forms so the annotators were told to use the following guidelines:

1. Any instance where one speaker implies the other is somehow indebted to him or her. This indebtedness can come from a previous solicited or unsolicited favor.
2. Any series of requests that starts with something large, then gets smaller by comparison. In cases like these, annotators were instructed not to tag the original request with reciprocity but all subsequent smaller requests instead. Here is an example, seen previously in Chapter II (aclusandiego.org, 2008), of such an exchange:

Utterance 1: POLICE NEGOTIATOR -- Okay. So what do you say? I think, you want to come outside.

Utterance 2: GRANT -- No, no.

Utterance 3: POLICE NEGOTIATOR -- Okay. You think you're going to want to come outside later.

Utterance 4: GRANT -- I don't know.

Utterance 5: POLICE NEGOTIATOR -- Okay. Can I get you at least to put the gun down?

Utterance 6: GRANT -- No.

Utterance 7: POLICE NEGOTIATOR -- How about if I get you to take the magazine or the clip out of the gun.

In this example, Utterance 1 would not be tagged with reciprocity, but Utterance 3, Utterance 5, and Utterance 7 would be tagged.

***c. Commitment***

For the principle of commitment, annotators were told to tag any instance where one party tries to make a deal with the other party. In instances of commitment,



there is usually an if-then exchange. In hostage negotiations, common examples are exchanging food or favors for hostages. Annotators were asked to tag any instance of an agreement and also if there was prodding by one party to recognize the agreement. In the following exchange, both Utterance 2 and 4 would be tagged with commitment.

Utterance 1: P1 -- Okay, I'll give you the pack of smokes, but you need to let the lady go, okay?

Utterance 2: P2 -- Okay, just send someone up here and throw the pack through the door, and I'll send her out.

Utterance 3: P1 -- Okay, so we have a deal, right?

Utterance 4: P2 -- yeah, okay.

#### *d. Consistency*

Consistency and commitment are similar but annotators were asked to distinguish the two in the tag system. Consistency can only be applied once a commitment has been made. Any reference to a previous commitment to persuade one party to hold up their part of an agreement should be marked with consistency. For example:

Utterance 1: Negotiator -- Okay, you've got the smokes, now let the lady go.

Utterance 2: Hostage Taker -- I don't know, she's my only leverage.

Utterance 3: Negotiator -- Hey man, you gave me your word that you would let her go. C'mon, do the right thing.

In this example, Utterance 3 is marked with consistency because the negotiator is reminding the hostage taker of a previous commitment.

#### *e. Scarcity*

Annotators were told to tag any utterance with scarcity if the utterance made reference to a fleeting situation. In other words, if negotiators talked about the

situation having the potential to get worse and that the hostage taker should surrender, then that utterance should be tagged with scarcity.

*f. Liking*

When tagging the principle of liking, annotators were told to watch for cases where the negotiator tries to note similar life experiences with the hostage taker. Things like similar jobs or familiarity with family issues were examples.

*g. Authority*

Annotators were told to tag any instances of authority figures with the hostage takers. If the negotiator was able to bring a parent into the conversation to convince the hostage taker to end the situation peacefully, annotators were told to mark the requests by the parents with the authority tag.

**2. First Annotation**

A persuasion tag vector was created and assigned to each utterance by the annotators. The annotators were asked to mark each utterance with any of the agreed upon principles. If there were multiple kinds of persuasion in an utterance, annotators were asked to rank them in order of importance. If an utterance contained at least one persuasion tag, then it was labeled persuasive. Figure 5 is an example of the tagging scheme from a bank robbery transcript (R. Rogan, personal communication, October 2, 2009).

Utterance	PERSUASION TAGS								PERSUASIVE?
	REASON	RECIPROCITY	COMMITMENT	CONSISTENCY	LIKING	SCARCITY	AUTHORITY	SOCIAL PROOF	
00092 PN1: Then I'll talk to Mr. <News Reporter's Last Name> on the phone.									0
00093 HT1: Yah, but you- Mr. <News Reporter's Last Name> is the only one I'm gonna trust and my wife, you hear?									0
00094 PN1: OK. Now let me ask you a question. Now, if Mr. <News Reporter's Name> asked you to let these kids out, and asked you how these kids are, will you answer his questions?			1						1
00095 HT1: Mr. <News Reporter's Name> is going to come in here.									0
00096 PN1: Ah- I don't think-ah- my boss, ok, my higher up, let him come in there. I don't- just for his safety also. But we have ta- we have ta- we'll have to work that problem when we come to it, OK?							1		1

Figure 5. Sample of a Transcript Annotation

Utterances 94 and 96 are marked with commitment and authority, respectively, so they each have a “1” in the persuasive category on the right. The other utterances are not persuasive, so they have a “0” in the persuasive category.

### 3. Evaluating the Initial Annotations

#### a. Initial Results

When two annotators tagged the same transcript, agreement was measured using the Cohen Kappa score described in Chapter II. We also considered Krippendorff's alpha measurement, but given the annotators' task, Cohen's Kappa is more appropriate, and the alpha measurements are nearly the same as the kappa scores (Krippendorff, 2007). Cohen's Kappa measure is useful because it takes into account agreement on both persuasive and non-persuasive utterances. The initial results were interesting but only showed moderate agreement, which is described in detail in Chapter IV. The initial results led annotators to consider whether or not the discrepancies in agreement were a training or model issue. In response to these questions, annotators took a 600 utterance transcript and tagged the first 300 utterances together, justifying with each other their

reasons for tagging certain utterances as persuasive. The goal was to tag the first 300 utterances together for training, and then tag the last 300 individually to compare results.

***b. Category Problems with the Initial Model***

One of the immediate observations between the annotators was the large discrepancy on deciding what the category “reason” encompassed. One of the reasons for the differences was the subjectivity of the criteria defining the principle of reason. Based on this difficulty, the category was eliminated, but this adjustment still left annotators with a few issues.

One issue was that annotators could agree that certain utterances were meant to be persuasive, but they sometimes felt the persuasion attempt did not fit into any of the Cialdini categories. The goal of this thesis was to detect persuasion in conversation, and if two annotators agree that an utterance is persuasive but cannot find a category that fits the persuasion description, then there is a problem. Rather than ignore these persuasion attempts, a new category was created, generically called “other.” The “other” category was used by annotators to tag any persuasive utterance that did not fit into the Cialdini categories. The following exchange is a good example in the use of the “other” category. In this example, Steve is a Branch Davidian involved in the standoff at Waco and Jim is a negotiator (Texas State University, 1993).

Utterance 1: STEVE - The news media was told to get out of the way and to back way off, much farther back than what they are even now. Why is that?

Utterance 2: JIM - Nobody's coming in there. A thousand percent absolute guarantee. I'm promising you, it's true, okay? Do we got those kids? Okay. Steve?

Annotators agreed that utterance 2 by Jim was meant to be persuasive with the use of words like “guarantee” and “promising”, but the utterance did not fall under any of original categories. In the new scheme, this utterance would be tagged with “other.”

Another problem that annotators discovered while tagging together was that some of the persuasion principle definitions were imprecise. This lack of precision can be correlated to the fact that there are over 25,000 utterances, and even with a pilot study, not all instances were discussed before the full annotation. During training, the key aspects of each principle were explained, but only one or two examples were given. Once annotators were able to view many instances of persuasion, they tended to slightly different definitions of the persuasion categories. However, while tagging the 300 utterances together, the annotators were able to arrive at more precise definitions on which they could all agree.

An additional problem was that some annotators were only tagging persuasion when the negotiator was speaking and did not consider that persuasion can occur on both sides of the negotiation. After discussion between the annotators, an agreement was reached to tag any instance of persuasion, regardless of the person speaking. The hostage takers can be persuasive in their own way by setting deadlines and demanding concessions in exchange for commitments, and the new tagging system would have to reflect that fact.

## **C REVISED MODEL AND SECOND ANNOTATION OF THE DATA**

Based upon their discussions, the annotators agreed that certain instances of conversation should be tagged with persuasion, and new, more precise definitions were created.

### **1. Reciprocity**

1. Look for instances where one party tries to make the other feel indebted to them
  - a. This is not a regular commitment (“If you do this, I’ll do that”)
  - b. The favor done should not be part of a previously established agreement, otherwise reminding the person of the agreement would fall under consistency

- c. In negotiations, common examples include instances where the negotiator relays to the hostage taker how hard he is working for him but needs something in return
- 2. Look for cases where the negotiator asks favor, which is then rejected, but then follows with a smaller favor. In cases like this one, do not tag the original request with reciprocity, but only the subsequent smaller requests.

## 2. **Commitment**

- 1. Look for any kind of deal making (“If you do this, I’ll do that...”)
- 2. May have to be taken in context as in the following excerpt (Texas State University, 1993):

Utterance 1: JIM: As soon as we get these kids hooked up, I'm going to go back and talk to these commanders --

Utterance 2: STEVE: All right. Okay.

Utterance 3: JIM: --about that perimeter motion, okay?

Utterance 4: STEVE: Right.

Utterance 5: JIM: And, and some of these issues we've discussed.

Utterance 6: STEVE: Right, okay.

Utterance 7: JIM: I've got to round them up. There's a bunch of them in here.

Utterance 8: STEVE: Okay.

Utterance 9: JIM: And --

Utterance 10: STEVE: And call me back then?

In this case, annotators agreed that Steve wants a commitment from Jim to call him back after he speaks with his commanders. Utterance 10 would be tagged with commitment, but there is no specific “If-then” phrase.

Here is another example (Texas State University, 1993) of understanding commitment within the context of the conversation:

Utterance 1: HENRY - Okay. So, you know, I would like for you, you know, in order for me to, to, to be able to, to sell all of this to my bosses, I need a little bit of help from you. Now, what I can do, or what I'd like to do is let me talk to them in terms of selling this to KRLD and maybe we can have KRLD then go national during prime time. And if we do that, will you agree to come out at that time?

Utterance 2: MR. KORESH - When you've done the national.

Utterance 3: HENRY – Okay.

Utterance 4: MR. KORESH - You can do KRLD and I'll still send the children.

Utterance 5: HENRY - Okay.

Utterance 6: MR. KORESH - You know.

Utterance 7: HENRY - All of them?

In this example, Utterance 1 is tagged with commitment (“if we have the tape played nationally during primetime, will you agree to come out?”) because it fits the commitment guidelines. In addition, Utterance 7 is tagged with commitment because it represents a different commitment (“If we play the tape on KRLD (the local station) will you send out all of the children?”). Utterance 7 is an example of a commitment without a literal “if-then” structure, and the commitment must be recognized by the context of the conversation. This type of tagging is one of the more difficult tasks for annotators, because it requires them to understand the context of the utterance. Utterance 7 (“All of them?”) by itself is just a question, not a commitment attempt, but taken in context of the negotiator trying to ensure the release of the children, it becomes a commitment attempt. It is worth noting that, in theory, one could view utterance 7 as an information request, not a persuasion attempt. If this was the first time David had ever mentioned the deal (children released for tape played locally) to Henry, Henry may have been just trying to establish what exactly the parameters of the exchange were. But in this instance, and in the context of the conversation, multiple annotators saw utterance 7 as a persuasion attempt.

3. Commitment can also be one party emphasizing an agreement has been made. Getting someone to recognize a commitment has been made is different from reminding them of a previous agreement, which is covered in the consistency tag.

### **3. Consistency**

1. When one party (party A) makes a reference to a previous commitment by Party B in order to persuade Party B into some action or request. Here is an example (Texas State University, 1993).

Utterance 1: HENRY - Okay. So, you know, I would like for you, you know, in order for me to, to, to be able to, to sell all of this to my bosses, I need a little bit of help from you. Now, what I can do, or what I'd like to do is let me talk to them in terms of selling this to KRLD and maybe we can have KRLD then go national during prime time. And if we do that, will you agree to come out at that time?

Utterance 2: MR. KORESH -: When you've done the national.

Utterance 3: HENRY - Okay.

Utterance 4: MR. KORESH -: You can do KRLD and I'll still send the children.

Utterance 5: HENRY - Okay.

Utterance 6: MR. KORESH -: You know.

Utterance 7: HENRY - All of them?

Utterance 8: MR. KORESH -: Not all of them yet. Like I say, when you go national, then they'll all come, all of us come.

This example is expounded from the previous commitment principle example. The negotiator (Henry) tries to get Koresh to commit to letting all of the people go (Utterances 1 and 7). However, Koresh himself uses the principle of consistency in



Utterance 8 to persuade Henry to stick to the original plan. Koresh reminds Henry of a previous agreement (a national radio address in exchange for full surrender) in order to make Henry abide by the original plan.

1. When one party (Party A) makes reference to a want or need by Party B in order to influence some kind of belief or action. In the following example (R. Rogan, personal communication, October 2, 2009), HT01 has taken control of an airplane and is demanding they bring a prisoner to the airplane so he can talk to him. ON82 is the attorney for HT01 and he is asking what HT01 needs:

Utterance 1: HT01 - Need an honorable way out.

Utterance 2: ON82 - Say it again. I didn't read you.

Utterance 3: HT01 - I need an honorable way out.

Utterance 4: ON82 - [ ] honorable way, <HT01 First Name>. We're not dealing with a, we're dealing with innocent people. That's not the honorable way. Uh, you and I have got to figure an honorable way out. Tell me what you mean by honorable way out.

<conversation goes on>

Utterance 5: 0478 ON82 - Okay, <HT01 First Name>, now one thing they need, and I think this is reasonable. It, you, you tell me if you don't think so. If I can get <Prisoner Last Name> out here, I need a show of good faith that you're, that we're dealing as man to man. Release the two women. Keep the men and the pilots but release the two women so I've got something to bargain with. I can't just tell these guys to shove it. I gotta have something to bargain with.

Utterance 6: HT01 - . . . got it.

Utterance 7: ON82 - Okay. Let the two stewardesses go. I'll kick their <expletive> 'til we get <Prisoner Last Name> out

here. Okay? Hang in there with me. Okay? Let me get some instructions on how to handle it.

Utterance 8: HT01 - I'll let the stew-, stewardesses go as soon as <Prisoner Last Name> comes.

Utterance 9: ON82 - <HT01 First Name>, we gotta have a show of good faith on your part first. I, I'm raising <expletive> to get him out to you. They're trying to raise the Attorney General in Washington. Let the girls go. You got the men left. That's honorable. We talked about children awhile ago. The girl's got a four-year-old daughter. She's a widow. There's nobody else but her. Let her off, and I'll kick <expletive> 'til I get something done. Okay?

In Utterance 2, HT01 expresses his need for an honorable way out and ON82 uses consistency in utterance 9 to convince HT01 to release the two stewardesses, claiming that it is the honorable thing to do.

#### **4. Scarcity**

1. Any utterance which implies explicitly or implicitly that time is a factor
  - a. A hostage taker setting a deadline for demands to be met
  - b. A negotiator claiming that a situation may get worse in the future unless the hostage taker acts now
2. Any time “secret” information is used to influence another party’s decision. The following example (P. Taylor, personal communication, September 20, 2009) is from a prison riot transcript:

Utterance 1: Hostage Taker - Now you have to your word all night long as far as I can see are you serious are about that?

Utterance 2: Negotiator - I am <Hostage Taker Name> okay.

Utterance 3: Hostage Taker - Everybody else

Utterance 4: Negotiator - let you all in on a little secret okay? These guards out here, they’re pushing me to get something done and I am trying to hold them

back because I know you all are up to your word; whatever you all gonna tell me you all gonna do, you all gonna do it, but these guys – they're, you know, they're nervous just like <name> is and I'm trying to calm them down. I got, man, I have to move offices. You notice how quiet it is now?

In Utterance 4, the negotiator uses “secret” information and the principle of scarcity to let the hostage taker know that the guards are getting anxious and that he needs to resolve the situation soon before things get worse.

## **5. Liking**

1. Any kind of compliment in order to influence decisions. Most times, annotators agree that influential compliments are given from the negotiator to the hostage taker, however there can be cases where the hostage taker uses the principle of liking to influence the negotiator.
  - a. Can be brown-nosing and insincere
  - b. Words and phrases like “buddy”, “friend”
2. Any reference to similar life experiences
3. Any expression of affection towards one party; phrases like “I like you” and “it’s important to me that you make it out of this” are examples.

## **6. Authority**

1. Appealing or making reference to a higher authority or expert in order to persuade or influence one party’s beliefs or actions
  - a. A negotiator making reference to his bosses needs in order to influence the hostage taker
  - b. A negotiator making reference to an authority figure in the hostage taker’s life like a parent or older sibling

2. Any request for action or belief to a hostage taker from an authority figure. If an utterance like “Please put the gun down and come outside” comes from the negotiator, then that utterance is not persuasive. However, if the same utterance were said by the hostage taker’s mother, then the utterance would be persuasive, because the mother is an authority figure. This type of tag requires the annotators to understand the context of the situation and the relationships between the parties.

## **7. Social Proof**

1. Any reference to what is normal or customary in situations (a social norm). The negotiator might make reference to what a judge would normally do in order to influence the hostage taker.
2. Any appeal to what a group thinks the person should do. A negotiator might make reference to the hostage taker’s friends or family, claiming they all think he or she should give up. In the following example (R. Rogan, personal communication, October 2, 2009), the negotiator (PN60) is trying to convince the hostage taker (HT01) to give up.

Utterance 1: PN60: Suppose you got a healthy body and a healthy mind, right?

Utterance 2: HT01: [Laughs] I wouldn't bet on that. [Laughs]

Utterance 3: PN60: Well hell that's quite a bit just that one right there. What? Well I don't know what to tell you know, you got all ' - [?]

Utterance 4: HT01: Huh?

Utterance 5: PN60: -- your friends talkin' to ya and tryin' to give you advice and these people who know you and like you.

In Utterance 5, the negotiator makes reference to the hostage taker’s friends and their opinion that he should give up. This kind of technique amounts to peer pressure and is a good example of the principle of social proof.

## **8. Other**

The “other” category is a catchall for any utterance that annotators view as persuasive but does not fit into the Cialdini model. This category is hard to define specifically because it is an open-ended group. However, annotators were able to agree on certain examples that qualify for the category.

1. A request from a non-authoritative family member like a sibling.
2. An appeal to the hostage taker to think about their children
3. An emphatic plea by the negotiator using words like “guarantee,” “absolutely,” etc., in order to gain trust
4. Reasons why certain actions should be performed (justifications)
5. Reminding of the trust built up between the two parties. For this type, annotators settled on the term “self-consistency” but did not want to include this in the consistency category, because it involved issues of trust rather than specific commitments.
6. Any other utterance that an annotator thinks is persuasive but does not fit under the Cialdini categories.

Annotators were told not to force persuasive utterances into the Cialdini categories. If they felt that something was persuasive but did not fit into the normal categories, then they were instructed to tag it with the “other” category.

## **D. PILOT TESTING OF THE NEW MODEL**

After tagging the first 300 utterances of the training transcript together, agreeing on more specific category definitions, eliminating the reason category and adding the extra “other” category, the annotators tagged the remaining 300 utterances separately. When comparing the 300 utterances that were individually tagged, the results showed a dramatic increase in agreement.

Figure 6 gives a visual representation of agreement between the three annotators.

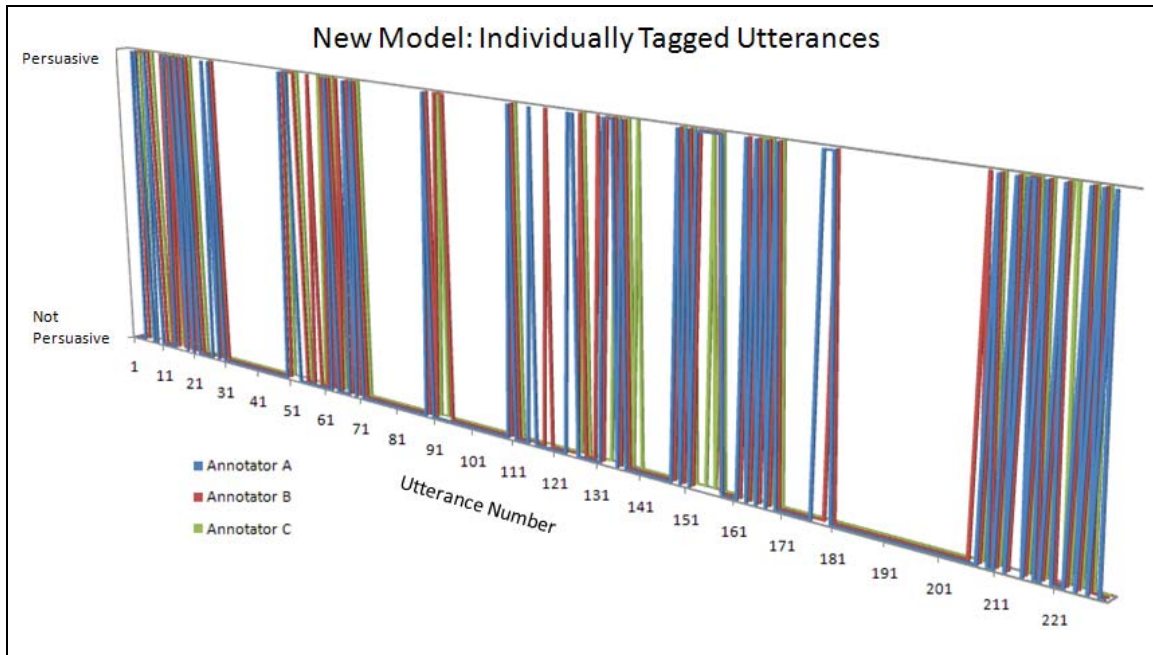


Figure 6. Graphical Representation of Agreement Between Annotators for Individually-tagged Utterances in the Test Transcript in the Re-designed Model

This figure shows the broad agreement between the three annotators using the new model. Visually, there are definitive persuasive sections of the conversation that all three annotators were able to identify. Based on these results, the annotators reran the experiment using the revised model, and the new results are detailed in Chapter IV.

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## IV. RESULTS AND ANALYSIS

### A. INTRODUCTION

This chapter discusses the results of our experiment described in Chapter III and is divided into three sections. The first section contains the results from the initial model and annotation experiment. The second section documents the results from the pilot study of the refined model where annotators tagged the first half of a 600-utterance transcript together and the last half individually. The last section contains the results of the new model with the altered categories and updated codebook. As discussed in Chapter II, the measurement for agreement is determined using Cohen's Kappa score, meaning a higher kappa score implies better agreement.

### B. INITIAL MODEL RESULTS

Each annotator was asked to label each utterance in an assigned transcript as persuasive or non-persuasive based on these eight categories: reason, reciprocity, commitment, consistency, liking, scarcity, authority, or social proof. Tables 3 through 11 detail the results of the experiment, with each table representing one transcript. The numbers in the cells represent the number of utterances given their label in the table. For example in the following table, the number 224 means there were 224 utterances in the Taylor1 transcript that Annotator A and Annotator B labeled as non-persuasive. The other numbers were calculated similarly given their corresponding labels.

Table 3. Results for Taylor1 Transcript (Initial Model)

Transcript: Taylor1		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	4	5
	Non-Persuasive	8	224
Kappa		0.353	



Table 4. Results for Waco\_11A\_3 Transcript (Initial Model)

Transcript: Waco_11A_3		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	9	1
	Non-Persuasive	0	124
Kappa		0.943	

Table 5. Results for Waco\_12B\_2 Transcript (Initial Model)

Transcript: Waco_12B_2		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	3	2
	Non-Persuasive	2	247
Kappa		0.592	

Table 6. Results for RoganF Transcript (Initial Model)

Transcript: RoganF		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	35	56
	Non-Persuasive	26	445
Kappa		0.380	

Table 7. Results for Waco\_14 Transcript (Initial Model)

Transcript: Waco_14		Annotator B	
		Persuasive	Non-Persuasive
Annotator C	Persuasive	5	7
	Non-Persuasive	8	905
Kappa		0.392	

Table 8. Results for RoganA Transcript (Initial Model)

Transcript: RoganA		Annotator B	
		Persuasive	Non-Persuasive
Annotator C	Persuasive	11	7
	Non-Persuasive	20	231
Kappa		0.398	

Table 9. Results for RoganB Transcript (Initial Model)

Transcript: RoganB		Annotator C	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	95	97
	Non-Persuasive	149	1781
Kappa		0.372	

Table 10. Results for Waco\_11B\_1 Transcript (Initial Model)

Transcript: Waco_11B_1		Annotator C	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	1	0
	Non-Persuasive	0	40
Kappa		1.0	

Table 11. Results for Waco\_13\_1 Transcript (Initial Model)

Transcript: Waco_13_1		Annotator C	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	2	0
	Non-Persuasive	0	17
Kappa		1.0	

The kappa scores showed mostly fair agreement, but there were some cases of kappa scores above 0.9. These high kappa scores seem to correlate with a low number of utterances in the transcript which is detailed in the Table 12.

Table 12. Transcript Kappa Scores & Agreement (Initial Model)

TRANSCRIPT	UTTERANCES	KAPPA	AGREEMENT
Taylor1	241	0.353	Fair
Waco_11A_3	134	0.943	Almost Perfect
Waco_12B_2	254	0.592	Moderate
RoganF	562	0.380	Fair
Waco_14	925	0.392	Fair
RoganA	269	0.398	Fair
RoganB	2122	0.372	Fair
Waco_11B_1	41	1.0	Perfect
Waco_13_1	19	1.0	Perfect

Figure 7 shows a graphical representation of the Table 12:

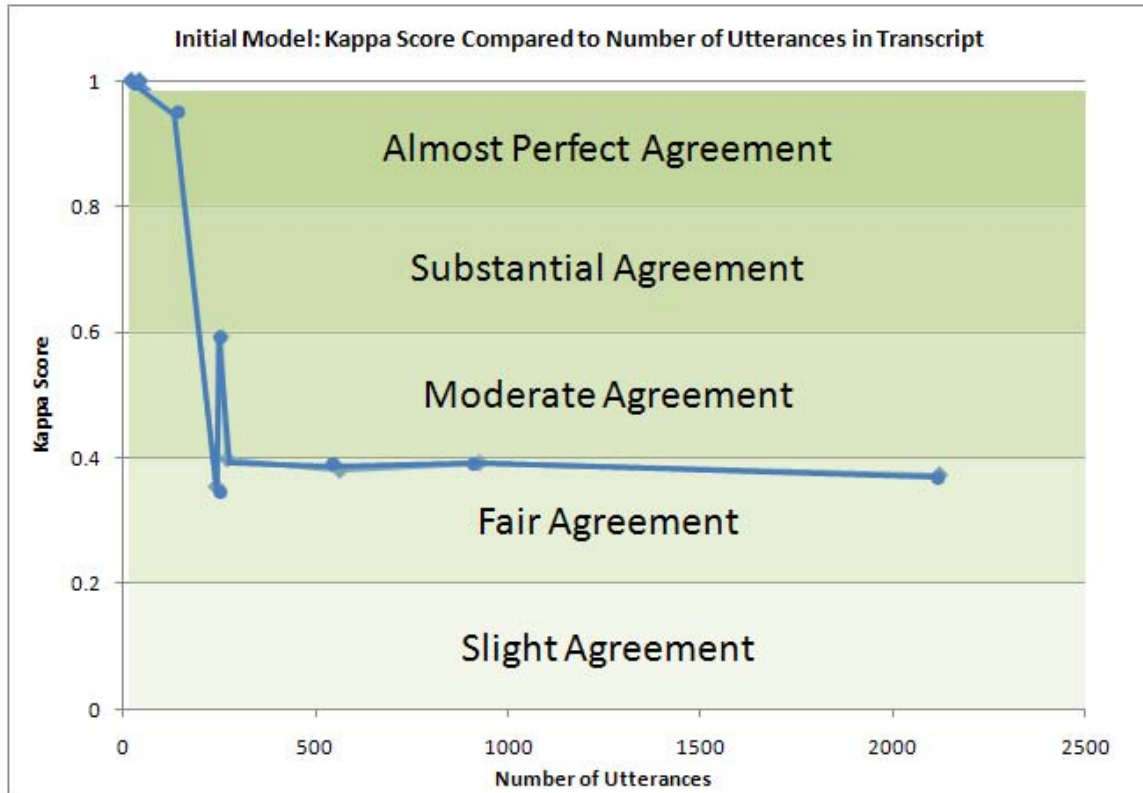


Figure 7. Kappa Score vs. Number of Utterances in Transcript (Initial Model)

The figure suggests that for the initial model and this particular group of annotators, there seemed to be an inverse relationship between the kappa score and the number of utterances in a transcript. The two transcripts that annotators scored perfectly, Waco\_11B\_1 and Waco\_13\_1, contained 41 and 19 utterances, respectively. These were the shortest transcripts of the entire sample. However, as the number of utterances increased, the kappa score decreased significantly. When the utterance level increased above 260, the kappa score was always below 0.4, meaning only fair agreement. Annotators were not exactly sure of the reason for the correlation between a low number of utterances and a high kappa score, but one theory suggested that a low number of utterances means a very small number of persuasive utterances. Table 13 shows the breakdown of persuasive utterances between transcripts tagged by multiple annotators. The parameters of the table are:

$n$  = the total number of utterances in the transcript

$P_A$  = the total number of utterances marked persuasive by the Annotator A

$P_B$  = the total number of utterances marked persuasive by the Annotator B

$P_C$  = the total number of utterances marked persuasive by the Annotator C

$P_T$  = total number of utterances marked persuasive by either annotator

Table 13. Percent of Transcript Marked as Persuasive (Initial Model)

Transcript	N	$P_A$	$P_A$ % of n	$P_B$	$P_B$ % of n	$P_C$	$P_C$ % of n	$P_T$	$P_T$ % of n
Taylor1	241	12	5.0%	9	3.7%			17	7.1%
Waco_11A_3	134	8	6.0%	10	7.5%			14	10.4%
Waco_12B_2	254	5	2.0%	5	2.0%			7	2.8%
RoganF	562	61	10.9%	91	16.2%			117	20.8%
Waco_14	925			12	1.3%	13	1.4%	20	2.2%
RoganA	269			18	6.7%	31	11.5%	38	14.1%
RoganB	2122	244	11.5%			192	9.0%	341	16.1%
Waco_11B_1	42	1	2.3%			1	2.3%	1	2.3%
Waco_13_1	19	2	10.5%			2	10.5%	2	10.5%

Figure 8 shows a histogram of the breakdown of percentages in the Table 13.

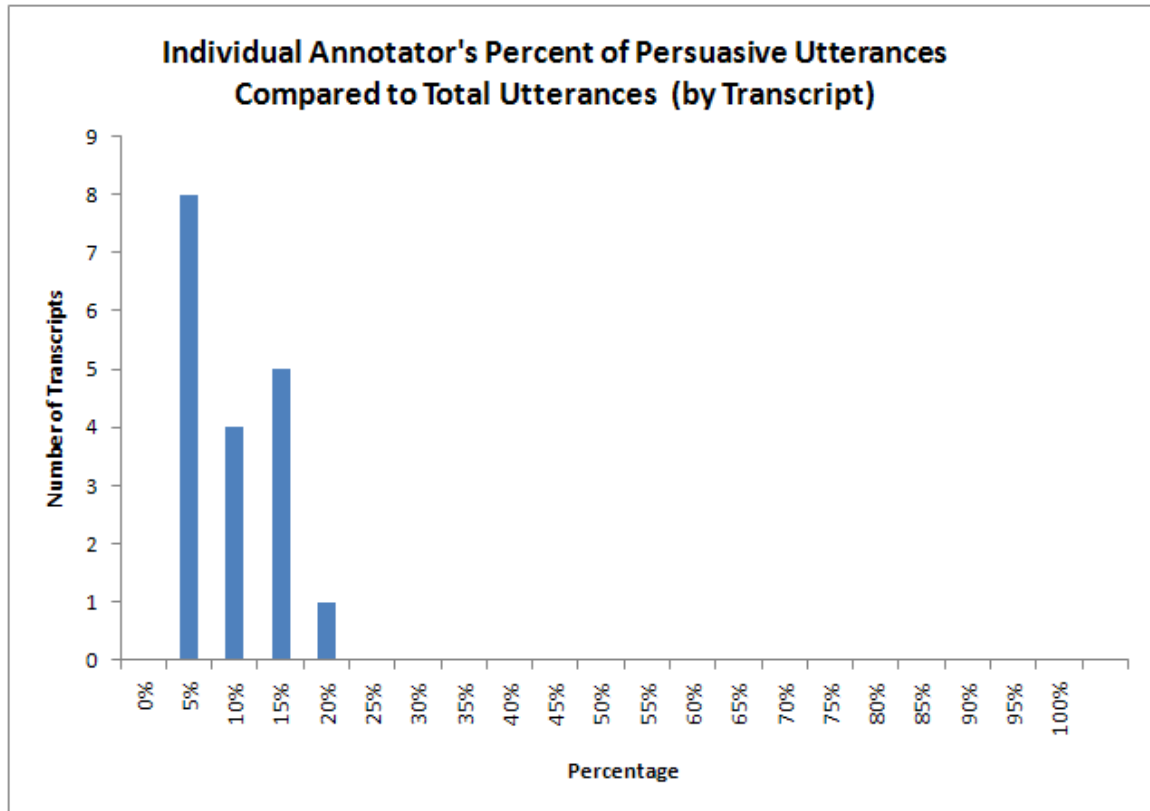


Figure 8. Histogram of Percentage Breakdown of Persuasive Utterances in a Transcript

As seen in Figure 8, the total number of persuasive utterances was usually under five percent and never above twenty percent. This correlation means that most of a transcript is non-persuasive utterances. A smaller number of utterances in the transcript implies there will be less persuasive utterances to tag. If there are only one or two persuasive utterances in a short transcript (as is the case with Waco\_11B\_1 and Waco\_13\_1), and the persuasive utterances are obvious to the annotators, then the kappa scores will be high. A longer transcript means more chances for disagreement and a lower kappa score. Even with the high kappa scores, this overall level of agreement was not suitable, because the code book described in Chapter III should be applicable to any transcript length.

### C. RETHINKING THE MODEL

As discussed in Chapter III, annotators went back and discussed the model while tagging a 600 utterance transcript together. They tagged the first 300 utterances together while discussing the model. After refining the definitions of each category, dropping the “reason” category, and adding the “other” category as a catch-all for any persuasive utterance that did not fall under the Cialdini principles, the annotators tagged the last 300 transcripts individually and compared results. The results showed significant improvement and are detailed in the following tables.

Table 14. Revised Model Results for Second Half of RoganD (Test Transcript) for Annotator A and Annotator B

Transcript: RoganD (last half)		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	15	2
	Non-Persuasive	11	106
Kappa		0.643	

Table 15. Revised Model Results for Second Half of RoganD (Test Transcript) for Annotator B and Annotator C

Transcript: RoganD (last half)		Annotator B	
		Persuasive	Non-Persuasive
Annotator C	Persuasive	19	3
	Non-Persuasive	7	105
Kappa		0.747	

Table 16. Revised model results for second half of RoganD (Test transcript) for Annotator A and Annotator C

Transcript: RoganD (last half)		Annotator C	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	15	2
	Non-Persuasive	7	110
Kappa		0.731	

The results in the Tables 14, 15 and 16 include the “other” category in the calculations. The initial hypothesis of the annotators was that the exclusion of the “other” category would increase the level of agreement, because the category was open-ended. Any utterance that an annotator felt was meant to be persuasive but was not part of the Cialdini categories could be marked with “other.” To test this hypothesis, the results were recalculated excluding the “other” category. Annotators were surprised that eliminating the “other” category from the results actually decreased the overall agreement as shown in Table 17.

Table 17. Kappa Score Comparison for Test Transcript with and without "Other" Category

Annotators	Kappa Score with “Other”	Kappa Score without “Other”	Change
A, B	0.643	0.550	-14.5%
B, C	0.747	0.453	-39.3%
A , C	0.731	0.652	-10.8%

The most likely reason for the increase in agreement using the “other” category is because the category has clearly defined parameters in the codebook. Essentially, it is the complement of the other seven persuasion categories for any utterance that can be marked persuasive. While the category is open-ended, annotators felt that when they



defined the category, they covered most of the possible examples where it could be applied. This observation suggests that the Cialdini categories do not fully cover the space of persuasion categories, at least with respect to hostage negotiations. Given that Cialdini's model is more applicable for business and social models which have some substantial differences compared to hostage situations, the model described in our research may be more applicable across different domains.

#### D. REVISED MODEL RESULTS

During the annotation of transcripts using the revised model, Annotator C was unable to complete the task, so the calculated results are only between Annotator A and Annotator B. Tables 18 through 21 show the results between four transcripts that included the "other" category.

Table 18. Results for Taylor6 Transcript (Revised Model)

Transcript: Taylor6		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	136	35
	Non-Persuasive	64	1858
Kappa		0.707	

Table 19. Results for Waco\_11B\_3 Transcript (Revised Model)

Transcript: Waco_11B_3		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	6	0
	Non-Persuasive	2	220
Kappa		0.853	

Table 20. Results for Waco\_13\_2 Transcript (Revised Model)

Transcript: Waco_13_2		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	12	4
	Non-Persuasive	5	291
Kappa		0.713	

Table 21. Results for Waco\_16\_1 Transcript (Revised Model)

Transcript: Waco_16_1		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	3	1
	Non-Persuasive	0	214
Kappa		0.855	

Table 22 summarizes the agreement between Annotator A and Annotator B for the four transcripts.

Table 22. Transcript Kappa Scores and Agreement (Revised Model)

TRANSCRIPT	UTTERANCES	KAPPA	AGREEMENT
Taylor6	2093	0.707	Substantial
Waco_11B_3	228	0.853	Almost Perfect
Waco_13_2	312	0.712	Substantial
Waco_16_1	218	0.855	Almost Perfect

For a comparison, Figure 9 shows the agreement between transcripts tagged by Annotator A and Annotator B for the original and revised models. It is worth noting that the annotators tagged different transcripts in the revised model than in the original one.

This adjustment was done to ensure that annotators would not be biased by annotating the same transcript again and covering the same material.

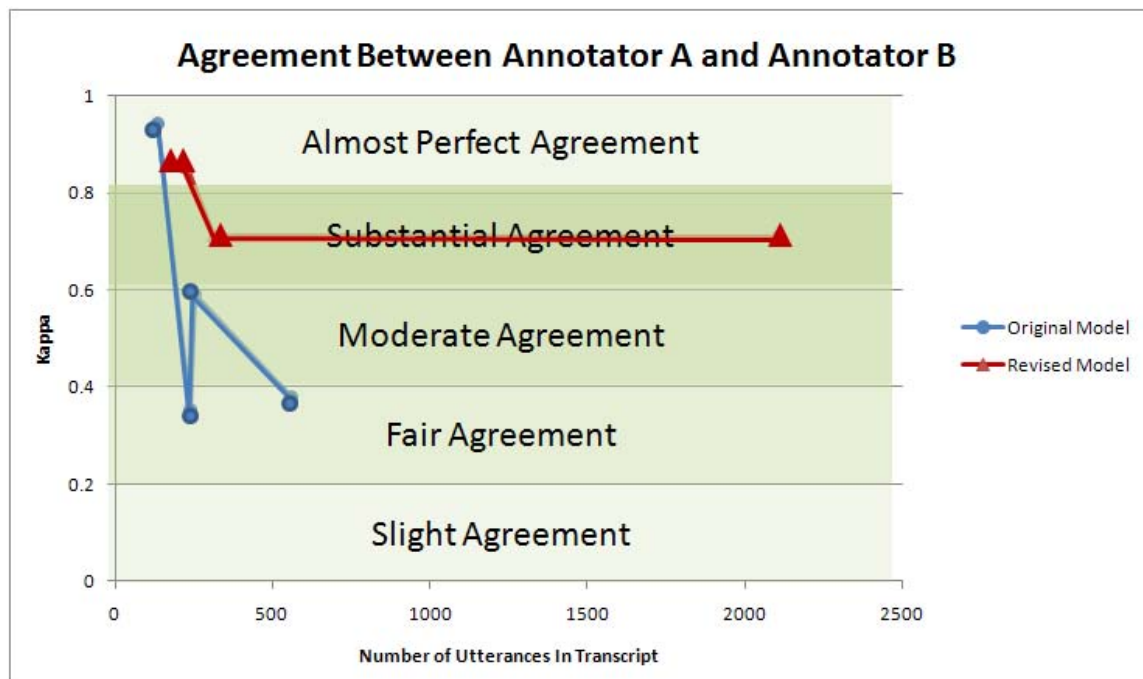


Figure 9. Kappa Score vs. Number of Utterances in Transcript (Revised Model)

This figure shows substantial improvement in the agreement results. In the original model, there was some cases of substantial agreement (above 0.6), but only when the number of utterances in the transcript was less than 260. In the revised model, there is consistent substantial agreement, even when the number of utterances in the transcript exceeds 2000.

Based on the pilot study of the new model where the inclusion of the “other” category increased the kappa score, annotators expected a decrease when the “other” category was removed from the results. Table 23 shows the change in kappa score when the “other” category was removed.

Table 23. Kappa Score Comparison With and Without “Other” Category  
(Revised Model)

Transcript	Number of Utterances	Kappa with "Other"	Kappa without "Other"	Change
Taylor6	2093	0.707	0.665	-6.0%
Waco_11B_3	228	0.853	0.497	-41.8%
Waco_13_2	312	0.712	0.552	-22.5%
Waco_16_1	218	0.855	1.000	17.0%

The last result for Waco\_16\_1 was unexpected as the kappa score increased when the “other” category was removed. An explanation for this result can be provided in the comparison of the Tables 24 and 25.

Table 24. Waco\_16\_1 Agreement Matrix With “Other” Category

Transcript with “Other”: Waco_16_1		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	3	1
	Non-Persuasive	0	214
Kappa		0.855	

Table 25. Waco\_16\_1 Agreement Matrix Without “Other” Category

Transcript without “Other”: Waco_16_1		Annotator B	
		Persuasive	Non-Persuasive
Annotator A	Persuasive	1	0
	Non-Persuasive	0	217
Kappa		1.00	

In the first table, there were only four utterances in the entire transcript that either Annotator A or Annotator B marked as persuasive, about 1.8 percent of the transcript. In

the second table, the number of persuasive utterances was reduced to just one, about 0.4 percent of the transcript. In other words, the persuasive utterances marked with “other” by either annotator comprised 75 percent of the total persuasive utterances in the Waco\_16\_1 transcript. When the “other” category was removed, there was only one utterance that the annotators tagged as persuasive. Moreover, the number of persuasive utterances is still sparse as show in the Table 26 (labels correspond to those in Table 13).

Table 26. Percent of Transcript Marked as Persuasive (Revised Model)

Transcript	N	P <sub>A</sub>	P <sub>A</sub> percent of n	P <sub>B</sub>	P <sub>B</sub> percent of n	P <sub>T</sub>	P <sub>T</sub> percent of n
Taylor6	2093	171	8.2%	200	9.6%	235	11.2%
Waco_11B_3	228	6	2.6%	8	3.5%	8	3.5%
Waco_13_2	312	16	5.1%	17	5.4%	21	6.7%
Waco_16_1	218	4	1.8%	3	1.4%	4	1.8%

The positive change shown for Waco\_16\_1 in Table 23 can be attributed to the sparseness of persuasive data as well as the large proportion of utterances tagged with “other” compared to the other seven persuasion categories.

For reference, a fully tagged transcript is provided in the appendix. The transcript (Waco\_11B\_1) is relatively short (41 utterances) but it will give the reader insight into the experiment and show examples of what the annotators did for each transcript.

## **V. CONCLUSION AND FUTURE WORK**

In this research, we developed a model for tagging persuasion in conversation based on the social-psychological model of James Cialdini. Cialdini’s persuasion categories were reciprocity, commitment and consistency, liking, scarcity, authority and social proof. We also added “reason” as a category for our model. Using this model, annotators tagged the utterances of 37 hostage negotiation transcripts as persuasive or non-persuasive and compared the results using Cohen’s Kappa score. Based on disappointing initial results, we eliminated the “reason” category and added “other” as a catchall for anything not covered by Cialdini’s categories. The experiment was rerun using the revised model and the results showed significant improvement in agreement between the annotators and formed the basis for an adjudicated corpus of persuasive conversations.

### **A. CONCLUSION**

Based on these results, the annotators concluded that the revised model for tagging persuasion is superior to the original one. This improvement is most likely due to increased structure in the revised model with more specific guidelines for annotators when tagging persuasion. The more specific criteria covered the Cialdini principles but also included adding the “other” category. From conversations with annotators, they were also able to more accurately tag the data with better experience. In that respect, the initial model was good practice for the annotators because many of the same types of persuasive utterances were tagged again in the revised model. It is also worth noting that hostage negotiations are unique circumstances filled with stressful situations and determined individuals. Although there are some similarities with other negotiations (business, political, etc.), hostage negotiations are fundamentally different. Life and death situations have a way of galvanizing individuals and may introduce methods of persuasion not covered by Cialdini.

Even though the results from the revised model showed substantial agreement, annotators felt that in order to perform any machine-learning on the data, a final

adjudicated data set had to be completed. Based on this need, Annotator A and Annotator B went through the entire data set and tagged each transcript together to produce a final persuasion corpus. The final corpus will hold each of the 37 transcripts with eight persuasion categories for each utterance in a transcript. If annotators marked more than one category in an utterance, they ranked the numbers in accordance of importance (highest to lowest). This corpus will be used in future work with computer science for persuasion-detection in conversation and provide a basis for machine-learning techniques to automatically separate persuasive and non-persuasive utterances.

## **B. FUTURE WORK**

With an adjudicated persuasion corpus, there is potential for developing machine-learning techniques to automatically divide the data into persuasive and non-persuasive utterances. Computational models such as Naïve Bayes and Support Vector Machines could be useful in accomplishing this goal. If these models prove successful, they might further be applied to a non-annotated corpus such as those from the perverted-justice corpus (Perverted-Justice.com). While the perverted-justice corpus is internet chat-based and not conversation transcriptions such as the ones in our research, there may be some techniques developed on our corpus that are transferrable to other domains.

Dialogue tagging could be another useful avenue of study with the adjudicated corpus. Each utterance would have to be broken down into separate sentences. Some of the transcripts contained punctuation and others were simply the transcription of the words of the conversation without punctuation, so the corpus would need to be standardized first. Once the sentences are tagged with dialogue acts, researchers could look for any correlation between particular dialogue tags (or sequences of dialogue tags) and persuasion attempts.

Additional work needs to be done on how persuasion is organized in conversation. Figure 10 shows the agreement between annotators during the testing of the new model (from Figure 6 in Chapter III). While tagging the data, annotators noticed that the hostage taker and negotiator would often have long spells of non-persuasive utterances. This is not unexpected because, as noted in Chapter IV, conversations are

mostly non-persuasive utterances. The annotators did notice that although the persuasive utterances in a transcript were sparse, there were many sections with persuasive utterances close together as seen in Figure 10. In other words, there were long spells of non-persuasive utterances followed by a few persuasive utterances.

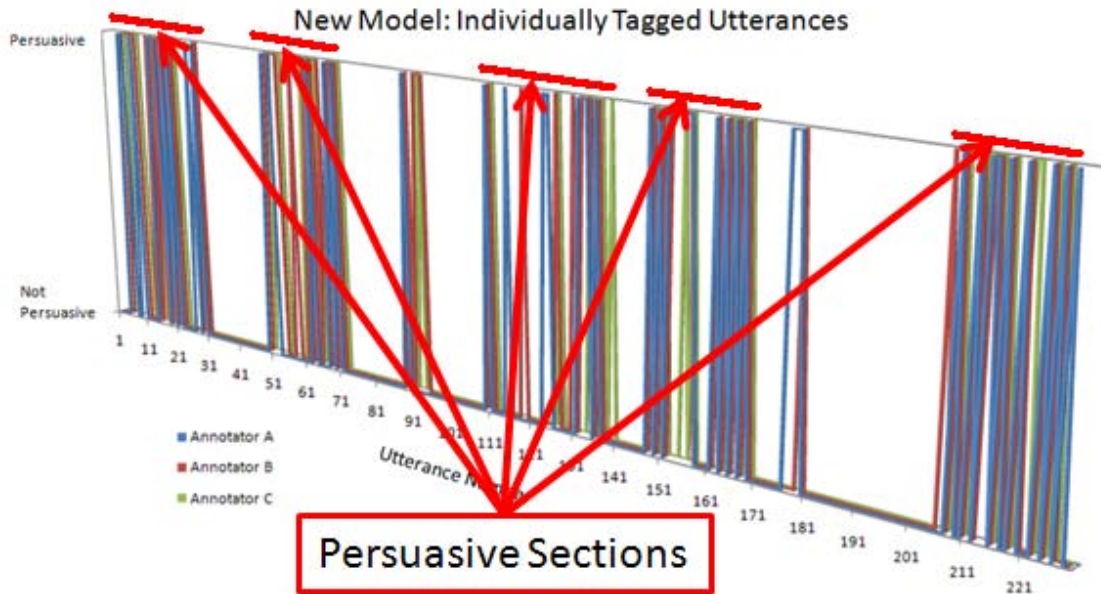


Figure 10. Persuasion Sections Based on Agreement Between Annotators for Individually tagged Utterances for the Test Transcript in the Re-designed Model

Figure 11 is a histogram of Annotator A's tagging results from the re-designed model that shows the number of utterances between persuasive utterances by speaker.



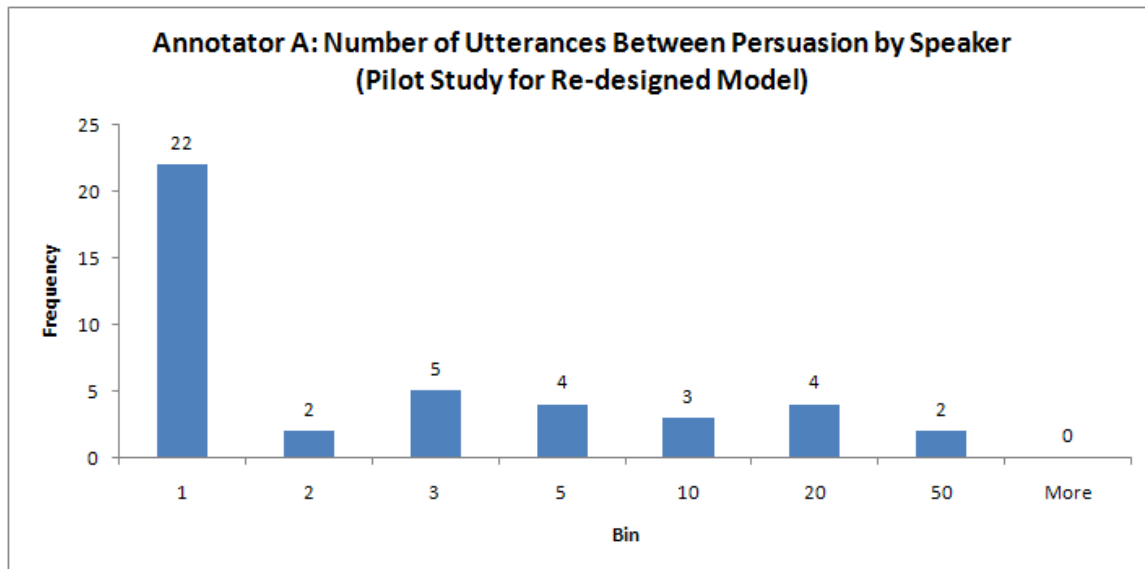


Figure 11. Histogram of the Number of Utterances Between Persuasive Utterances (by Speaker) for Annotator A in the Test Transcript

Most persuasive utterances only had one utterance separating them, and this one utterance was usually the other party's response to the persuasion attempt. Intuitively, the negotiator usually tried to build some kind of rapport with the hostage taker by listening to his or her demands, discussing logistics and other issues, and then tried a persuasion technique. This technique can take several utterances to develop, like the rejection-then-retreat approach of reciprocity discussed in Chapter II. It would be useful to use the adjudicated corpus and perform the same kind of analysis in coordination with any machine-learning systems developed for the corpus. If the system has difficulty recognizing individual utterances as persuasive, it may have more success determining if certain sections of the conversation are persuasive.

There are other methods used in perspective analysis that may be applied to persuasion detection. Some persuasion is the negotiator attempting to show that his or her point of view is the correct one, and that the hostage taker should surrender. While it may be trivial to determine which perspective the negotiator and hostage taker have, it may be useful to use subjective sentence classifiers (Riloff & Wiebe, 2003) to determine if the utterance is subjective and if that subjectivity correlates to any persuasion attempt.

Additionally, it may be useful to refine the “other” category, described at the end of Chapter III, into separate cases. A category like “duty” may be appropriate for utterances that deal with family members. Family members like a hostage taker’s children or younger siblings may not be authority figures but can still influence his or her decisions. Other categories may be “self-consistency” or “rapport building.” Some of these cases may even be extensions of the Cialdini categories that annotators did not recognize, but may be useful to split the cases of the “other” category into separate instances.

Finally, while not all persuasive utterances contained an extensive number of words, annotators did recognize that the longer the negotiator spoke in an utterance, the more likely that utterance contained some form of persuasion. To explore this observation, a transcript was randomly selected (Waco\_12A\_2) from the adjudicated data set and was divided into persuasive and non-persuasive utterances. We compared the total number of each kind of utterance versus the average text length (the number of characters). Figure 12 shows that non-persuasive utterances were much more prevalent in the Waco\_12A\_2 transcript, but Figure 13 shows that persuasive utterances had a larger average text length than non-persuasive utterances.

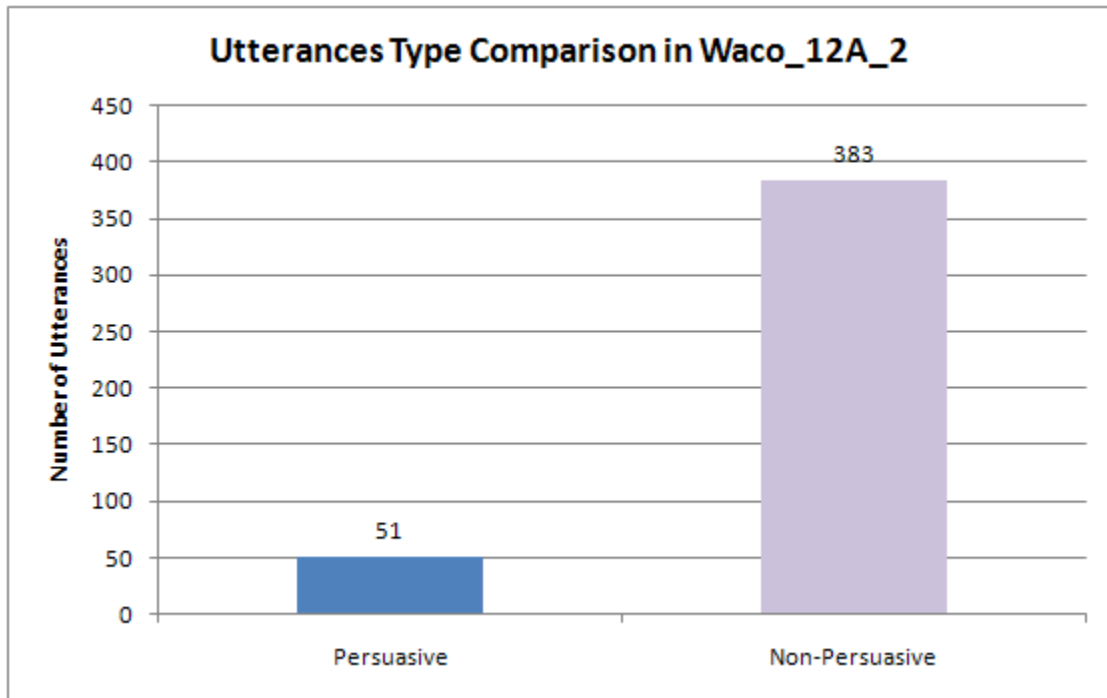


Figure 12. Count of Utterance Types in Waco\_12A\_2

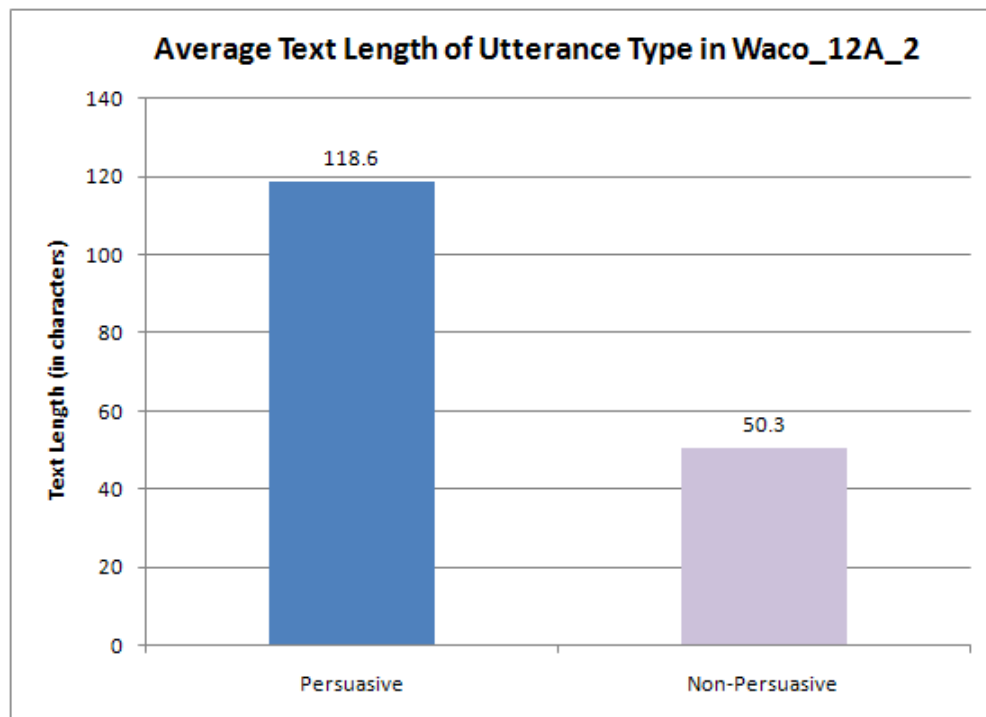


Figure 13. Average Text Length (in Characters) of Persuasive and Non-Persuasive Utterances in Waco\_12A\_2

As the figures show, while non-persuasive utterances are more prevalent throughout the transcript, the average persuasive utterances is 236% longer than the average non-persuasive utterance. This kind of attribute should be explored on the entire adjudicated corpus and perhaps added as a feature-vector in a machine-learning system.

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## APPENDIX

The table is an example of a full transcript with annotation. The transcript is from the Waco tapes (Texas State University, 1993) and was annotated by Annotator B. In the transcript, David is the leader of the Branch Davidians, Rita is one of David's followers, and Henry is an FBI negotiator.

Utterance	ANNOTATOR B							
	OTHER	RECIPROCI TY	COMMITME NT	CONSITEN CY	LIKIN G	SCARCIT Y	AUTHORI TY	SOCIAL PROOF
RITA: Hello?								
HENRY: Rita?								
RITA: Just a minute, please.								
HENRY: Hello?								
DAVID: Hello?								
HENRY: How are you doing?								
DAVID: I'm, I'm trying to finish up. I mean it's --								
HENRY: You making progress?								
DAVID: Oh, yeah. I'm trying, trying to get it done. It's, it's raining outside, isn't it?								
HENRY: Well, I'm inside of a room. I can't really -- I don't have a window.								
DAVID: Well, that's, that's heavy rain.								
HENRY: Is that right?								

Utterance	ANNOTATOR B							
	OTHER	RECIPROCI TY	COMMITME NT	CONSITEN CY	LIKIN G	SCARCIT Y	AUTHORI TY	SOCIAL PROOF
DAVID: Yeah. Okay, yeah. Let me finish this up, and I'll get right with you. Call me in about another 15 minutes, okay? We should --								
HENRY: About -								
DAVID: -- be finished.								
HENRY: In about 15 minutes?								
DAVID: Right.								
HENRY: Okay. You -- and we're still on-line for the rest of the stuff. That is I mean we still have the two women and, and two, and two kids that will --				1				
DAVID: Right. Yeah, they said they'll do it.								
HENRY: Okay. Okay.								
DAVID: Okie doke?								
HENRY: Okay.								
DAVID: Okay. Let me get back on this then.								
HENRY: Okay. Very good.								
DAVID: Oh, boy. I feel like I did a boxing match.								
HENRY: Okay. Now try to keep it short because, you know, the, these people are not going to want to play something that's real long, okay?	1							
DAVID: Okie doke.								
HENRY: Okay.								

Utterance	ANNOTATOR B							
	OTHER	RECIPROCI TY	COMMITME NT	CONSITEN CY	LIKIN G	SCARCIT Y	AUTHORI TY	SOCIAL PROOF
DAVID: I mean how long do they want it to be?								
HENRY: Well, you know, remember the, the thing that you did for Jim before?								
DAVID: How long was that?								
HENRY: About half a page or so. You know, you --								
DAVID: Oh, that?								
HENRY: You, you don't have to make it that short. But you know --								
DAVID: All right.								
HENRY: But, but don't make it like a half hour or something like that.								
DAVID: Like I said, I have to make it-- at least wanted to make the point, okay?	1							
HENRY: Okay.								
DAVID: Okay, thanks.								
HENRY: Okay.								
DAVID: Okay, bye.								
HENRY: I'll talk to you later. Bye.								



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